

# MOTOR AGE

Volume XXXVII  
Number 23

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, JUNE 3, 1920

Thirty-five Cents a Copy  
Five Dollars a Year

## 100,000 Owners Are Selling Hudsons, Too

No other fine car enjoys such advertising, as these satisfied owners give Hudson.

They help keep it the largest selling fine car in the world. And Hudson dealers profit by this great selling force.

Its own merit won Hudson its prestige, and unrivalled place in motordom. Everything its reputation for matchless endurance, speed and power, are known. Its leadership in performance, and in mode are acknowledged.

Hudson dealers share the fame and prestige of Hudson. Note the type of men they are. They are leaders in every community. Their stores reflect the prosperous business they enjoy.

And 97% of the Hudson product is sold through men whose connection is more than 6 years. That is why Hudson franchises are noted for their profitableness and permanency.

We exercise care in the selection of Hudson dealers. A Hudson franchise is not easy to get. But once secured, the backing, aid and confidence of a great organization goes with it.

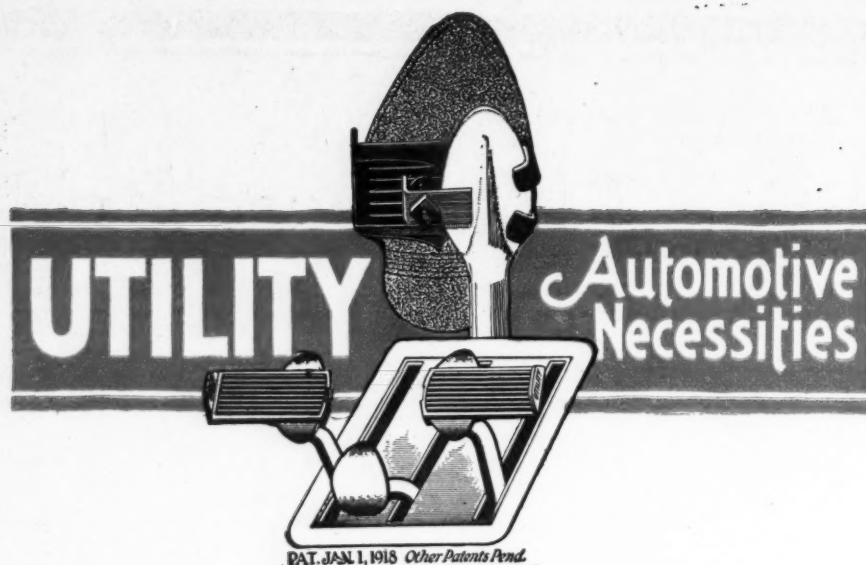
If you want a business with orders booked ahead, with an assurance of permanency, and with the prestige all Hudson dealers share, you would do well to investigate the opportunity to secure a Hudson franchise.

Hudson Motor Car Company



Detroit, Michigan

(H-6)



## UTILITY Pedals *for* Fords

**T**HERE is a definite reason why every accessory for Fords sells, or does not sell.

UTILITY Pedals are a necessity—so designated by users who know.

Necessities sell.

Every Ford owner who buys a new car this spring should equip it immediately for safety and convenience, with UTILITY Pedals for Fords.

Every owner who is driving a Ford car from last season, or before, is a live prospect for a UTILITY Pedal sale to start the summer right.

Millions of UTILITY Pedals for Fords are needed. They turn over fast in stock. Ask your jobber for them. He can furnish you on demand.

Jobbers: Get in touch with us.

Price per set \$1.25

## HILL PUMP VALVE COMPANY

---

Mfrs. of UTILITY Protected Heaters, UTILITY Pedals for Fords, UTILITY Pumps, UTILITY Universal Rim Wrenches and UTILITY Universal Wrenches

---

Belmont and Knox Aves.

CHICAGO

SALES DEPARTMENT

THE ZINKE CO.

1323 S. Michigan Avenue, Chicago



# MOTOR AGE

Published Every Thursday by

THE CLASS JOURNAL COMPANY

MALLERS BUILDING

59 East Madison Street, CHICAGO

HORACE M. SWETLAND, Pres.

W. I. RALPH, Vice-Pres.

E. M. COREY, Treas.

A. B. SWETLAND, Gen. Mgr.

Member Audit Bureau of Circulations; Member Assoc. Business Papers, Inc.

Vol. XXXVII

June 3, 1920

No. 23

## CONTENTS

<b>The Checkered Flag to the Winners.....</b>	<b>7</b>
<i>Pictures of the Drivers Arranged According to Their Places in the Race.</i>	
<b>The Small Engine Has Made Good.....</b>	<b>8</b>
<i>An Account of the Indianapolis 500-Mile Classic.</i>	
<b>What Tom Wilder Saw at the Race.....</b>	<b>12</b>
<i>Pen and Ink Stories by Our Staff Artist.</i>	
<b>A Picture Trip Through a Drop Forging Plant.....</b>	<b>13</b>
<i>Showing the Immense Machinery Used for This Work.</i>	
<b>Service Managers Meet at Indianapolis.....</b>	<b>14</b>
<i>Things Are Getting Under Way as Result of Recent Convention.</i>	
<b>Peculiar Automotive Conditions of Kern County, Cal. ....</b>	<b>16</b>
<i>Why Car Sales Are Easy Here and Tractors Sell Less Readily.</i>	
<b>Tomorrow's Mechanics—Where Are They Coming From? .....</b>	<b>17</b>
<i>Dealers Reluctant to Train Inexperienced Men.</i>	
<b>The Pneumatic Truck Tire—Article III.....</b>	<b>18</b>
<i>Problems Encountered When Changing a Truck from Solids to Pneumatics.</i>	

## NEWS SECTION

<b>Real Gasoline Famine Hits California.....</b>	<b>21</b>
<b>To Ask Congress For Federal Good Roads Department.....</b>	<b>22</b>
<b>Lax Enforcement of Laws Cause of Car Thefts.....</b>	<b>23</b>
<b>Louisiana-Mississippi Men to Meet at Gulfport Oct. 6.....</b>	<b>24</b>
<b>Ship-by-Truck Drive Teaches Dealers Need of Roads.....</b>	<b>26</b>
<b>Highway Council Watching Moves of Railroads.....</b>	<b>26</b>
<b>Interstate Commerce Commission Urges Use of Trucks.....</b>	<b>27</b>
<b>Hoosier Dealers See Big Results from Truck Tour.....</b>	<b>27</b>
<b>Atlanta Federal Reserve Bank Shuts Off Credit.....</b>	<b>28</b>
<b>Manufacturers Accede to Deflation Campaign Plans.....</b>	<b>28</b>
<b>New Hampshire College Has Mechanical Training Course.....</b>	<b>29</b>
<b>Bloomington Dealers Join New Illinois Association.....</b>	<b>29</b>

## DEPARTMENTS

<b>Standard Mechanical Tractor Operations.....</b>	<b>30</b>
<b>Servicing the Overland Four.....</b>	<b>32</b>
<b>Garage Planning.....</b>	<b>34</b>
<b>Readers' Clearing House.....</b>	<b>36</b>
<b>The Accessory Show Case.....</b>	<b>42</b>
<b>Service Equipment.....</b>	<b>43</b>
<b>The Automotive Repair Shop.....</b>	<b>44</b>
<b>Piston Ring Sizes Data Sheet.....</b>	<b>45</b>
<b>Law in Your Business.....</b>	<b>46</b>
<b>Weekly Wiring Chart.....</b>	<b>47</b>
<b>Passenger Car Specifications Table.....</b>	<b>48</b>
<b>From the Four Winds.....</b>	<b>52</b>

## MOTOR AGE

MALLERS BUILDING  
CHICAGOPhone Randolph 6960  
Cable Address "Motage"

E. E. HAIGHT, Manager

DAVID BEECROFT, Directing Editor

RAY W. SHERMAN, Executive Editor

B. M. IKERT, Editor

### BRANCH OFFICES

DETROIT, 95 Fort St., W. Phone Maine 1351

CLEVELAND, 536-540 Guardian Bldg., Main 6432

NEW YORK CITY, U. P. C. Bldg., 239 W. 39th St.

Phone Bryant 8760

PHILADELPHIA, Widener Bldg., Phone Locust 342-343

### SUBSCRIPTION RATES

United States, Mexico and U. S. Possessions.....	\$ 5.00 per year
Canada.....	7.00 per year
All Other Countries in Postal Union.....	10.00 per year
Single Copies.....	35 cents

Make Checks Payable to Motor Age

Entered as second-class matter, September 19, 1899, at the Post Office, Chicago, Illinois, under Act of March 3, 1879.

Owned by UNITED PUBLISHERS CORPORATION, 239 W. 39th St., New York, H. W. Swetland, Pres.; Charles S. Phillips, Vice-Pres.; W. H. Taylor, Treas.; A. C. Pearson, Sec.

# THE NEXT TIME HE'LL ASK FOR IT



Sell a man a Sure-Seal outfit once and he's sold forever. The next time he

needs equipment of this kind he'll ask for Sure-Seal.

Your assurance that Sure-Seal is a quality product lies in the fact that it is a Dutch Brand Product. His assurance lies in the kind of service it gives him.

# Sure-Seal

## ALL RUBBER SELF CURING PATCH

Sure-Seal is a permanent repair for punctures and blowouts in tubes. It is easy to use. It requires no heat or acid. It is self-curing. The convenient, durable carton with screw top contains everything to make a quick, inexpensive repair—at any time, in any place. Sure-Seal repairs anything made of rubber. Three sizes—50c., 75c. and \$1.00. Order from your jobber.

*Dealers: Send for 1920 Catalog*

The entire Dutch Brand line is listed and priced.

**VAN CLEEF BROTHERS**

MANUFACTURERS

Woodlawn Ave., 77th to 78th Sts.

Chicago, Illinois



# Velie Dealers Have A Wonderful Advantage

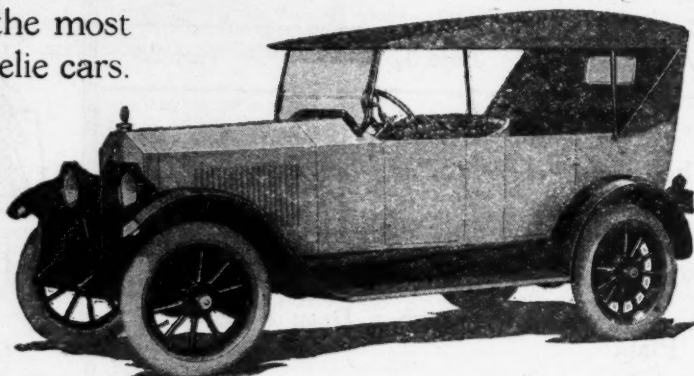
The present season opened with the most successful of all the long line of Velie cars.

## Model 48

### *The Authoritative Style*

Its popularity is now one of the familiar stories of the motoring world. Its snappy body design instantly won for it the title of "The Authoritative Style"—and its powerful motor burning low grade fuel is giving performance in keeping with its beauty.

Then came another addition to the Velie family—



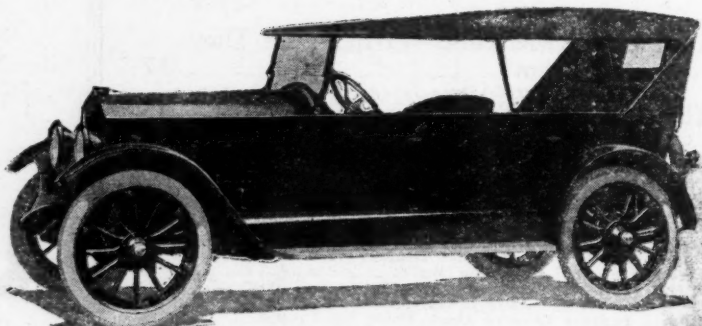
Model 48 Velie Touring Car. There are five models of this line: Touring, Sedan, Coupe, Roadster and Speedster—all in the Authoritative Style.

## Model 34

### *A Smaller Six at Lower Price*

A car that embodies every essential of Velie quality in appearance and performance. With long, graceful body in the Velie lasting mirror finish, and upholstered in genuine leather. With sure and silent six-cylinder power. A car of marked distinction anywhere—at a lower price.

And now to give the Velie dealer the widest range of the market we are delivering



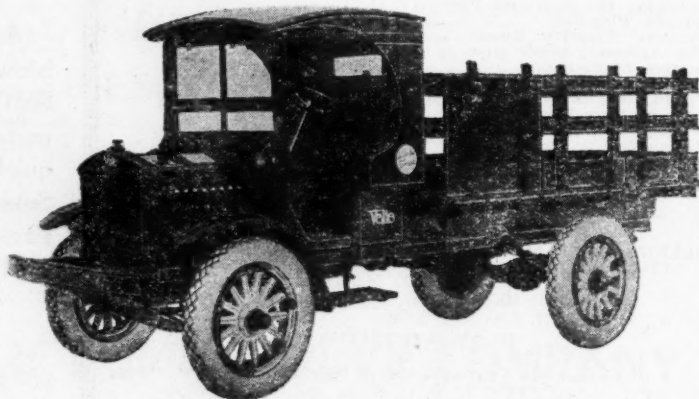
The new Velie Model 34 Touring Car—at a lower price.

## Velie Model 46

### *Ton-and-a-Half Truck*

The entire facilities of the Velie Truck factory are now concentrated on this one model. A truck that covers 90% of all trucking needs. With more speed—with double the service—at half the service cost of heavier models. Solid or pneumatic tires.

The first truck to show what pneumatic equipment can do. Here is Velie quality in a truck of the range that is outselling all others combined.



46—Velie Ton-and-a-half Truck. Body types furnished for every use.

And back of this complete line one of the largest manufacturing organizations of America with more than half a century of manufacturing experience. If Velie is not represented in your territory we suggest that you get in touch with us.

**VELIE MOTORS CORPORATION**

**113 Velie Place**

**Moline, Illinois**



# MOTOR AGE

## The Checkered Flag to the Leaders



Here are the men who were entered in Monday's race at Indianapolis which proved the small-engined, light car has come to stay. The leaders are arranged in the order in which they finished. For a time it appeared that Ralph De Palma was to smash precedence by winning his second race, but then his old Jinx got in its deadly work and shoved him out of the lead and back in fifth place. It was a field day for the Chevrolet brothers, Gaston driving to a victory in a Monroe car which was the product of Louis' designing skill and constructing genius





An American car the winner at last! Gaston Chevrolet in the Monroe, the first United States built car which has won an Indianapolis Derby since 1912, and in the circle, Louis Chevrolet the veteran race driver who designed and built the machine.

# The Small Engine Has Made Good!

Performance of Racers at Indianapolis  
This Year Proves the Soundness of New  
Designing and Construction Theories

**I**NDIANAPOLIS, May 31—The light weight, small engined racing car made good here to-day. It went through a racking, grinding 500 miles of extreme speed in a way which delighted and astonished even the most enthusiastic adherents of the light car idea. Gaston Chevrolet, driving an American-built Monroe car, won the race at a rate of 88.16 m. p. h., but Gaston's victory was of minor importance as compared with the wonderful showing made by the small car in its first trial.

## All Teams Get Honors

To be more specific, every team of cars which was ready for the race went through with flying colors. The Ballots, Frontenacs, Monroes and Duesenbergs, to say nothing of individual cars carrying other engines, performed in a way which demonstrated clearly that the designers of to-day are able to get quite as much speed, quite as much en-

BY LAMBERT G. SULLIVAN

durance out of the lightweight, small engined cars as their predecessors were out of much larger machines.

Six teams of cars, in all, started in the race, and four of them finished creditably. Of the two failures—the Peugeot and the Gregoire—the latter was manifestly not ready to take part in the race and should not even have been permitted to start. The Gregoires were thrown together in so great a hurry that even the qualifying laps revealed defects in their design obvious even to the uninitiated. The Peugeot failed because of designing defects—defects which were admitted even before the race by the Peugeot drivers, but which they had not the time to remedy.

All in all, it was a great race, not spectacular in any sense of the word, but a real trial of the cars entered. Con-

sidered from a sporting standpoint, the race was not nearly as good as some of its predecessors at the Hoosier oval: considered in the light of its importance to the future of the automobile industry, it is unsurpassed. For it assured the future of the light car and proved that light cars can be built which are in every way the equal of their heavier brothers of the present.

## Chevrolet Gets Highest Credit

To Louis Chevrolet and his brother Gaston will go the major honors of the day, but there are plenty of honors to go around and Ernest Ballot and Fred Duesenberg are honestly entitled to a full share of the reward for the wonderful showing of the new cars. Louis and Gaston won the race, but Ballot and Duesenberg showed conclusively that they have developed small engines to just as great a degree of perfection as the winners.

## STANDING AT THE END OF EACH 50 MILES

Distance	Time	M.P.H.	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
50 Miles	33:05.3	90.67	Boyer	Klein	Chassagne	G. Chevrolet	R. Thomas	L. Chevrolet	Wilcox	Milton	O'Donnel	Murphy
100 Miles	1:05:40.63	91.36	Boyer	Chassagne	G. Chevrolet	R. Thomas	DePalma	L. Chevrolet	Wilcox	Milton	Hill	Murphy
150 Miles	1:39:43.28	90.25	Boyer	DePalma	Chassagne	G. Chevrolet	L. Chevrolet	Wilcox	Hill	O'Donnell	Murphy	Milton
200 Miles	2:11:13.61	91.45	Boyer	R. Thomas	DePalma	G. Chevrolet	Chassagne	Milton	Murphy	Goux	Henderson	Wilcox
250 Miles	2:44:26.46	91.22	Boyer	G. Chevrolet	R. Thomas	DePalma	Chassagne	Milton	Murphy	Goux	Henderson	Hill
300 Miles	3:18:36.45	90.63	DePalma	Boyer	G. Chevrolet	R. Thomas	Chassagne	Murphy	Milton	Goux	J. Thomas	Boyd
350 Miles	3:51:18.4	90.79	DePalma	G. Chevrolet	R. Thomas	Chassagne	Boyer	Milton	Murphy	Goux	J. Thomas	Goux
400 Miles	4:24:36.16	90.70	DePalma	G. Chevrolet	R. Thomas	Chassagne	Vail	Milton	Murphy	J. Thomas	Hearne	Boyd
450 Miles	4:58:33.53	90.44	DePalma	G. Chevrolet	Chassagne	R. Thomas	Milton	Vail	Murphy	J. Thomas	Hearne	Boyd
500 Miles	5:40:16.14	88.16	Chevrolet	R. Thomas	Milton	Murphy	DePalma	Hearne	Chassagne	J. Thomas	Mulford	Alley

## Prize Winnings

	Purse	Lap Prizes	Total
Gaston Chevrolet.....	\$20,000	\$1,300	\$21,300
Rene Thomas.....	10,000	700	10,700
Tommy Milton.....	5,000	.....	5,000
Eddie Murphy.....	3,500	.....	3,500
Ralph De Palma.....	3,000	8,300	11,300
Eddie Hearne.....	2,200	.....	2,200
Jean Chassagne.....	1,800	100	1,900
J. Thomas.....	1,600	.....	.....
Ralph Mulford.....	1,500	.....	1,500
Tom Alley.....	1,400	.....	1,400
Joe Boyer.....	.....	9,500	9,500
Art Klein.....	.....	100	100

In addition to his prize winnings, Gaston Chevrolet received awards from equipment manufacturers which brought his winnings to approximately \$35,000.

It is a source of some pride to know that the car which won the race is an American product, the first American winner since the historic victory of Joe Dawson in a National in 1912. The Monroe, as well as the Frontenac, were designed and built by Louis Chevrolet, an American citizen, and embodied the ideas that their builder has imbibed in his long career as a racing driver in the United States. The Monroes and Frontenacs were identical in construction and, although they competed under different names, should be regarded as being truly one entry.

Ballot again proved himself capable of designing cars for new conditions. That a Ballot did not win the race was the fault of carelessness rather than anything else, for had not Ralph De Palma permitted himself to run out of fuel far from the pits, it is almost certain the French car would have won. Even without the victory, however, Ballot has good cause to feel satisfied with his achievement, for every one of the three cars he entered in the race finished within the first ten.

## Duesenbergs Make Showing

Fred Duesenberg also had a memorable achievement. Four Duesenbergs were at the line for the start of the race and three of them finished within the money. It seemed as if the Duesies were not quite as fast as the Ballots and the Chevrolet creations, but their performance impressed those who saw the race that they were extremely reliably constructed and that they were capable of standing a great deal of work.

Far less engine trouble was experienced by the new cars than had been anticipated by technical men. It was their general belief that few of the cars in the race would escape without any serious trouble of this sort. It eventuated, however, that there was little more engine trouble than has usually been the case even with cars which have been thoroughly tried out.

The chief trouble experienced by the cars was the breakage of parts which ordinarily go through races without trouble. This was directly due to the "metal fatigue" occasioned by the hurry in which the cars were put together and are regarded by technical men as being of slight importance. The basic correctness of the small car idea having been proved to be correct, minor defects, such

as those developed in the race, are merely a matter of care in construction and selection of materials.

W. F. Bradley, European representative of Motor Age, was agreeably surprised with this lack of trouble. Before the race he declared that neither of the Gregoire cars was ready for the grind and should not be counted seriously. The Peugeot, he declared, had numerous defects in design and would not be serious factors, while the Ballots alone would be given a fair trial.

Mr. Bradley frankly stated before the race that until the race was run, it would be impossible to pass judgment on the Ballots. After the race he declared that he was astonished that so little engine trouble had been encountered and was vastly pleased with the excellent showing in that all three of the Ballots finished inside the money.

The American cars, which had even a more severe test of their ability than the French, inasmuch as there were three complete teams and two different designs under trial, while it would be just to hold the results of the race a test of only one European, fared fully as well as the French. For the sake of brevity, the Monroes and Frontenacs may be considered as one team, for they were identical in design and construction, both the product of Louis Chevro-

## How They Finished

Place	Car	Driver	Time	M.P.H.
First.....	Monroe.....	Gaston Chevrolet.....	5:40:16.14	88.16
Second.....	Ballot.....	Rene Thomas.....	5:43:02.29	87.47
Third.....	Duesenberg.....	Tommy Milton.....	5:46:43.38	86.52
Fourth.....	Duesenberg.....	Jimmy Murphy.....	5:52:31.37	85.10
Fifth.....	Ballot.....	Ralph De Palma.....	6:05:19.15	82.12
Sixth.....	Duesenberg.....	Eddie Hearne.....	6:14:19.16	80.15
Seventh.....	Ballot.....	Jean Chassagne.....	6:15:15.68	79.94
Eighth.....	Monroe.....	Joe Thomas.....	6:21:41.55	78.60
Ninth.....	Special.....	Ralph Mulford.....	7:19:03.75	68.33
Tenth.....	Special.....	Tom Alley.....	7:21:40.18	67.93

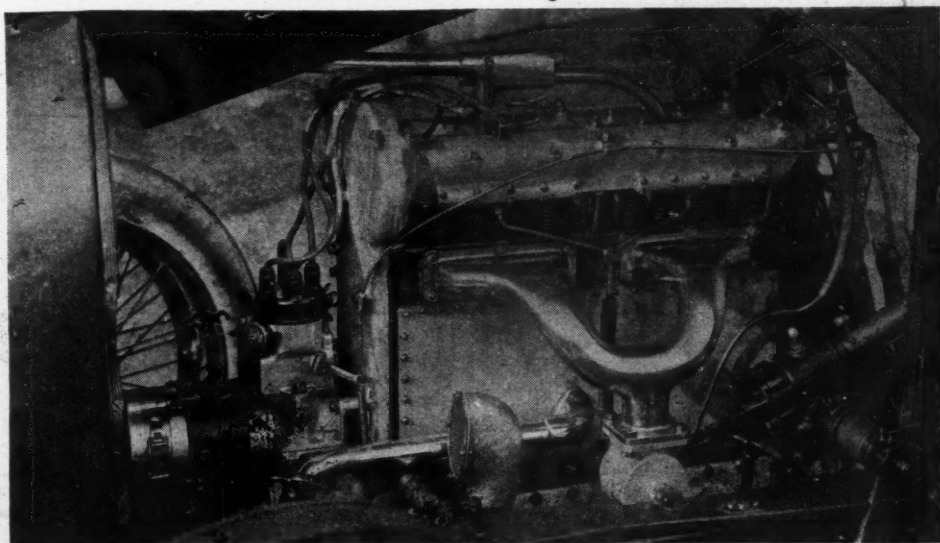
let's designing skill and mechanical genius.

There were seven of the Monroe-Frontenac cars in the race and of these two finished among the first ten. Of the remainder, not one was forced out of the race by engine trouble, the causes of their withdrawal being rather defective or overstrained materials. The fact that two of these cars were forced out by breaks in the steering gear and that two more were forced out because of accidents occurring because of the difficulty in handling the mounts would seem to point out to Chevrolet a defect in his design which he may be able to remedy for later races.

## O'Donnell Breaks Oil Line

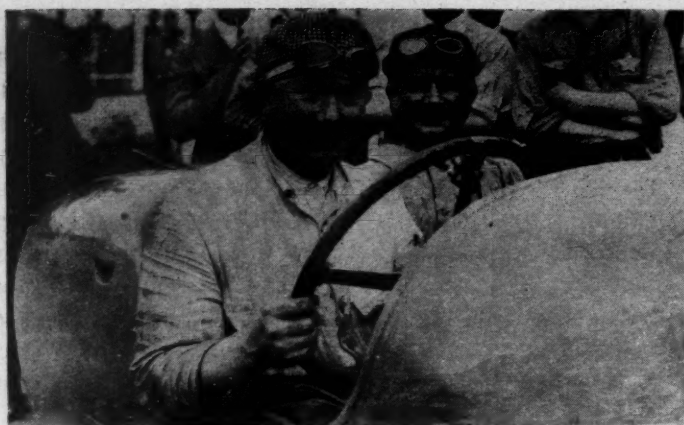
Fred Duesenberg upheld his reputation for building engines of staunchness by the excellent work of the team of four cars entered under his colors. Three of the four Duesies finished in the money, third, fourth and sixth places falling to him. The only Duesenberg car which failed to finish the race was the one driven by Eddie O'Donnell, which was forced out after more than three-quarters of the race had been completed, because of a broken oil line.

The teamwork of steadiness of the Duesenbergs was one of the big features of the day. Lap after lap the yellow



Carburetor side of the Monroe engine. The outstanding feature of the 500-mile grind was in the performance of the small engine. The utmost in efficient designing is necessary to obtain the high power and speed required for racing





Two of the Ballot team which finished in the money. At the left, Rene Thomas who finished second, and at the right Ralph De Palma who finished fifth after having apparently had the race won

cars rolled around the track, Milton and Murphy sticking together in one pair and Hearne and O'Donnell in another. It seemed as if they were running on a

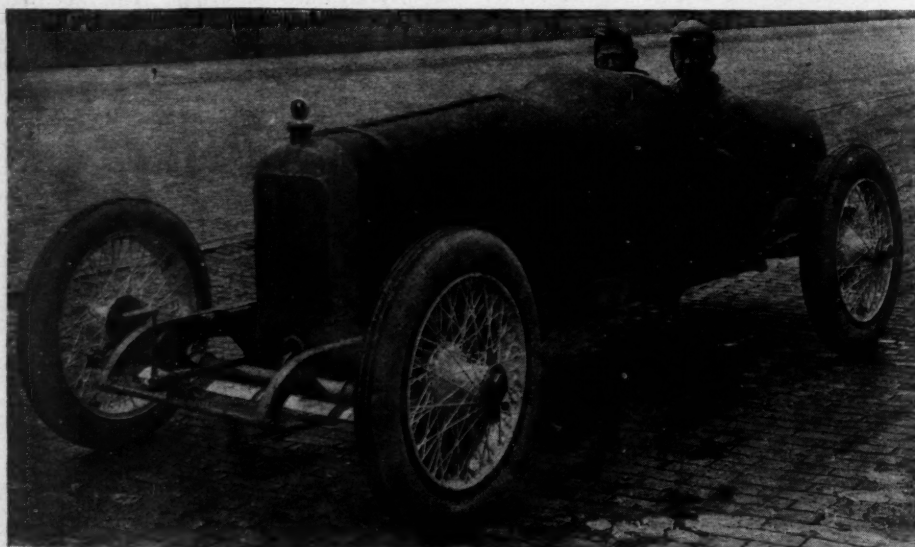
alert, but after the century mark had been passed, there were not enough brushes to make the race really appeal to the crowd. After De Palma and

Boyer had fought their duel in the first 100 miles, every change of leadership came because the leader was forced to the pits, permitting the second car to pass him.

Ralph De Palma had more than his share of bad luck, but a trifle more care probably would have won the race for him, despite all his misfortunes. He twice had tire trouble in the first 200 miles of the race, both coming at crucial times, but was remarkably fortunate in escaping trouble for the last 300 miles, and had he stopped and made assurance doubly sure by taking on fuel when he had an advantage of more than two laps over his closest competitor, he probably would have flashed over the wire in first place.

#### Careful Race by Chevrolet

Chevrolet won the race by as consistent an exhibition of driving as has ever been seen on an American track. He never was in the lead until he took it near the close, when De Palma ran out of fuel, but at the same time he never was worse than fourth, and he set and maintained a pace which he believed



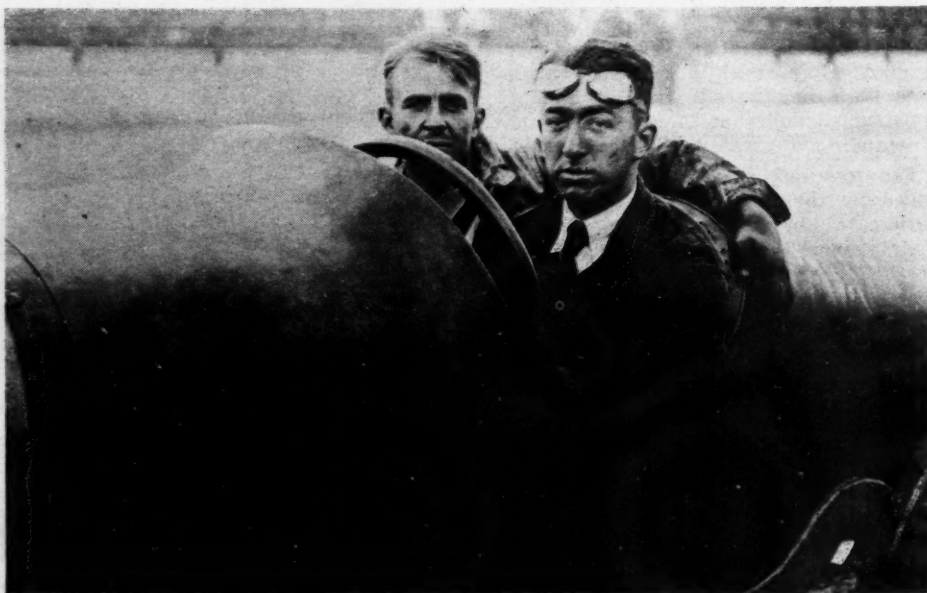
Tommy Milton, star of the Duesenberg team, who took third place

schedule of the utmost exactitude, for their appearances in front of the judges' stand were almost clocklike in their regularity and steadiness. The fact that O'Donnell was forced to quit the race was the only cloud in a perfect day for Mr. Duesenberg.

#### Crowd Estimated at 120,000

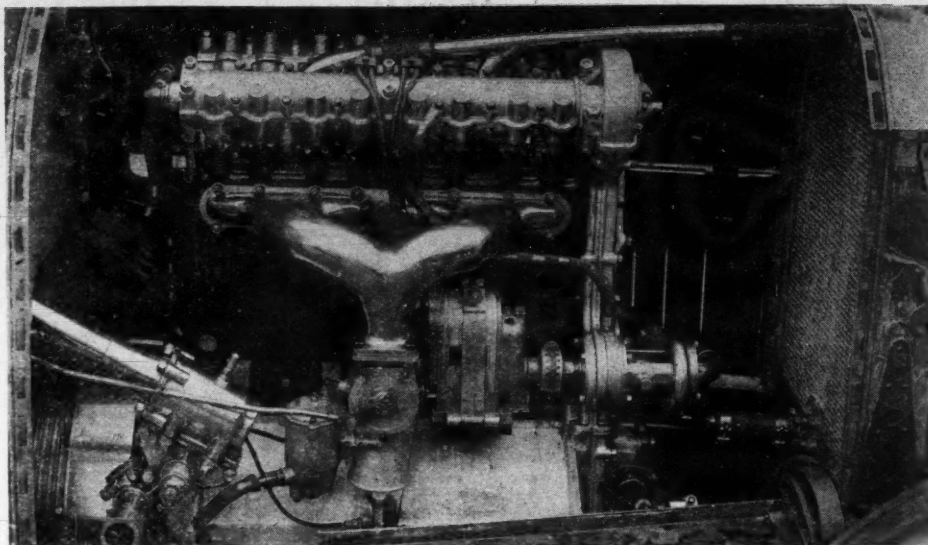
Considered strictly as a sporting event, the race left much to be desired. It was seen by what probably was the largest crowd which ever saw a race at the Hoosier oval, an estimate of better than 120,000 attendance being issued by the Speedway management after the race. Ideal conditions prevailed for the race, the weather being a trifle cooler than is ordinarily experienced at the Memorial Day classic, while there was just enough dampness in the atmosphere to aid carburetion.

For the first 100 miles of the race, there was plenty of interest to keep the spectators alert. Ralph De Palma and Joe Boyer hooked up in a duel which kept the big crowd constantly on the



Jimmy Murphy, winner at Beverly Hills who drove his Duesenberg to fourth position





Magneto and carburetor side of the original Baby Peugeot engine

would win for him, ignoring all challenges from other drivers to engage in brushes. It was this steadiness and consistency which won for him and he showed this steadiness even to a greater extent when he stopped only ten miles from the finish to replenish his gas, oil and water in order to avoid falling into De Palma's blunder.

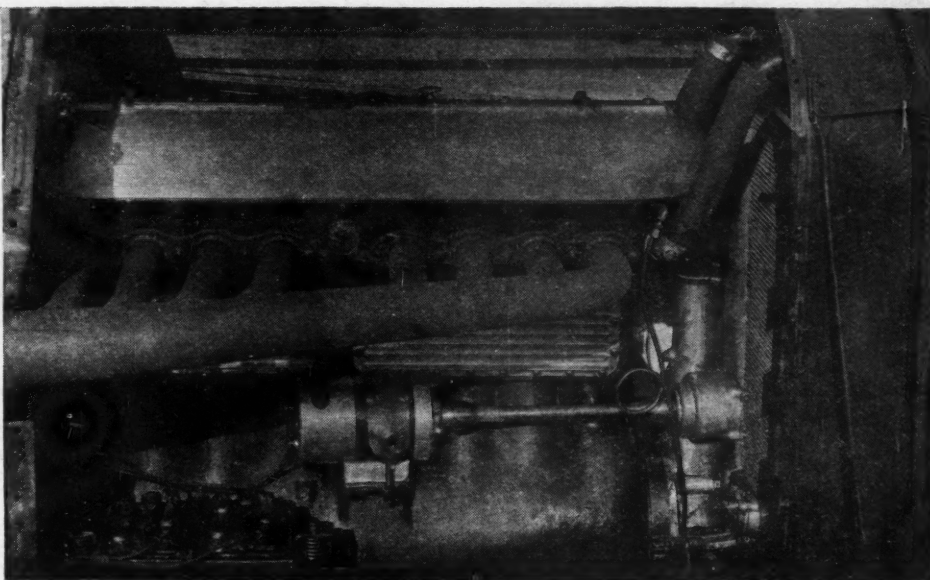
Action of Indianapolis merchants in adding the sum of \$20,000 to the regular Speedway purse, to be distributed in prizes of \$100 to the leader at the end of each lap in the race, undoubtedly speeded it up, especially at the start. Several of the drivers in the race were fearful that their cars would not be able to make the full 500 miles and they were resolved to earn as much as possible in the way of lap prizes as long as their cars held together. This caused almost the entire field to go out and "beat it" from the start, and the pace was much faster than it would have been had there been no lap money at stake.

There was, fortunately, a complete ab-

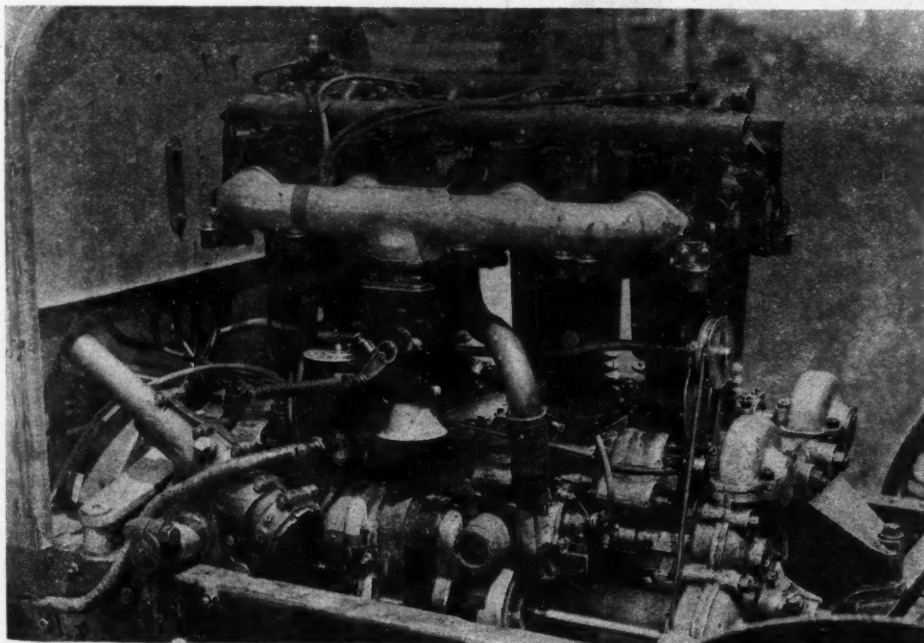
sence of the accidents which marred last year's race. Several of the cars ran off the track and into the retaining wall and Ira Vail, who took Boyer's seat in the latter part of the race, overturned, but he and his mechanic escaped serious injuries. Considering the remarkable prevalence of steering gear trouble in the race, the fact that no one was injured is one of the most remarkable features of the race.

De Palma ran into his bad luck almost at the very start of the race. When the cars wheeled across the wire at the end of the pacing lap, it was seen that De Palma's right rear tire was flat and he was forced to drive into the pits for a change, even before he had made his first lap. This mischance threw him into seventeenth place and forced him to go out and beat it from the start to catch up with his competitors.

The lure of the lap money early manifested itself, for the drivers pushed their



The 8-cylinder engines designed by Fred Duesenberg stood up well



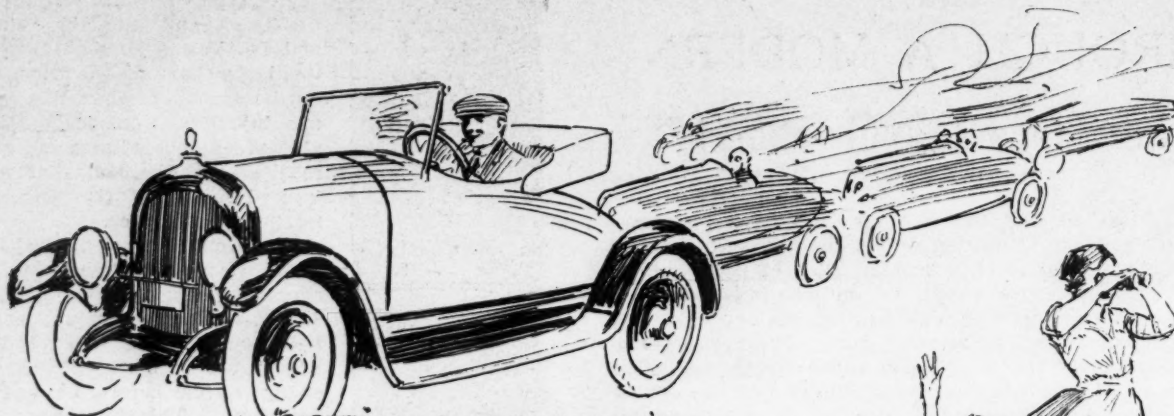
Carburetor side of the Gregoire engine. The Gregoire was ruled off the course

cars to the utmost right from the start, each eager to roll up a number of lap leaderships and swell his winnings. Joe Boyer's car proved the fastest of the field in this jockeying and he quickly drove into the leadership, relinquishing this honor in only two of the first thirty-eight laps, Art Klein nipping him on one lap and Jean Chassagne on the other.

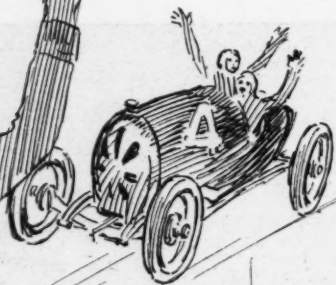
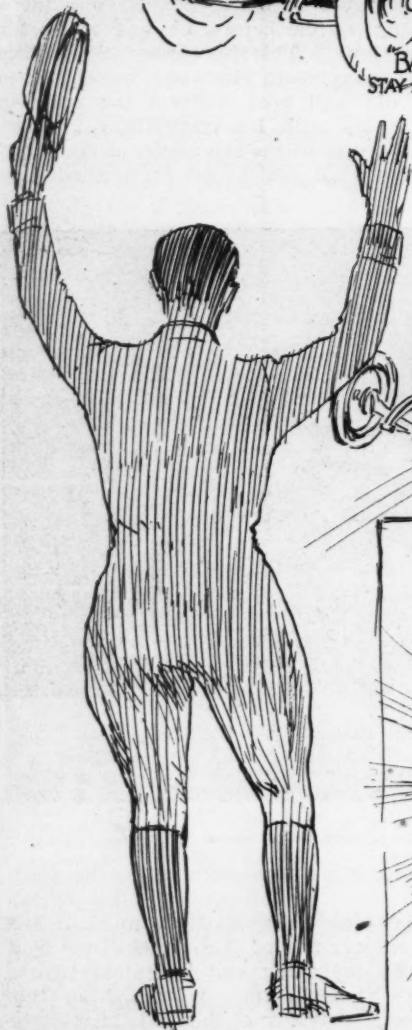
While Boyer was rolling up this big total of lap money, De Palma was behind him, driving like a fiend to make up the ground he had lost in his tire change in the first lap. The big white car crept up foot by foot and yard by yard on the green one, until at the end of the thirty-ninth lap it finally overtook and passed the leader.

For only two laps did De Palma pick up the \$100, however, another stop for tires and gasoline and oil giving back the position to the Frontenac driver, Boyer continued to make the most of his opportunity and never was again headed until his first tire change gave Rene Thomas a chance to pass him and cross the line ahead of him for seven successive laps.

# What Tom Wilder Saw at the Race



"BARNEY" THE RETIRED HERO WHO CAN'T  
STAY AWAY - HE LED THE GRAND MARCH THIS YEAR

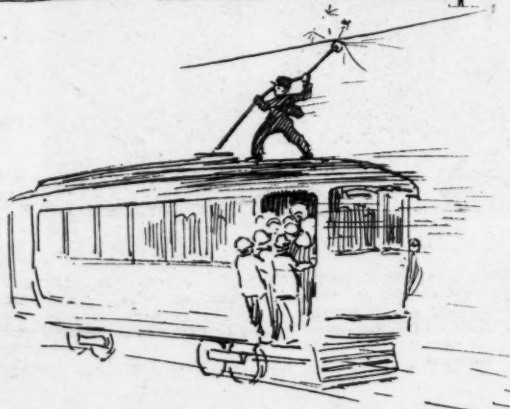


THERE WAS NO SHORTAGE OF  
SILK HOSE OR GEORGETTE



THE WEATHER MAN  
WAS VERY KIND, SO THERE  
WERE FEW SUNBURNED NOSES

LOUIS CHEVROLET WAS THE  
HAPPIEST MAN AT THE RACE.  
HIS CAR AND HIS BROTHER  
BOTH WON

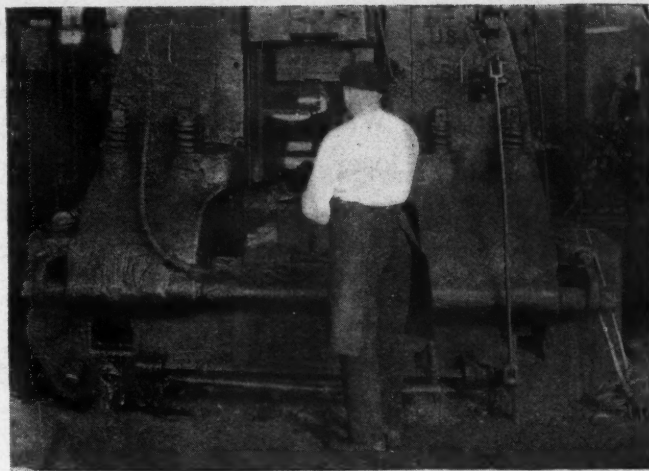


M. BALLOT AND THE  
ENGINEER WHO DESIGNED  
THE CARS



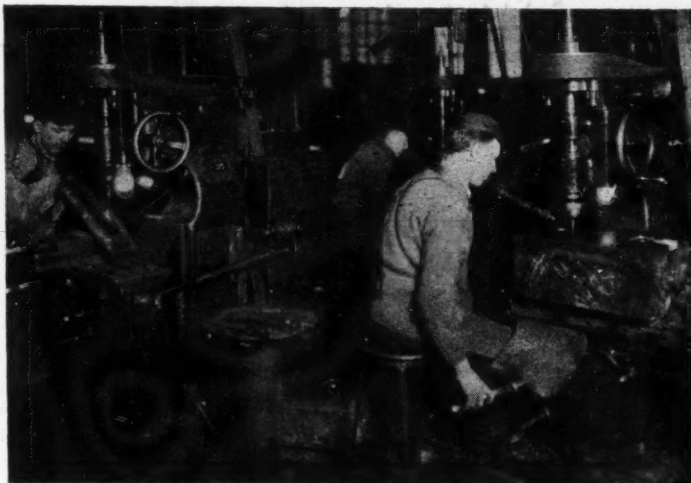
## A PICTURE TRIP THROUGH A MODERN DROP FORGING PLANT

"THAT'S the nearest thing to the front line trenches I ever came across on this side of the big pond," said an ex-service man after a trip through the John Obenberger Forge Co.'s plant in Milwaukee. To one who has never been through a modern drop forging institution, the accompanying photographs cannot tell a complete story. They cannot suggest the deafening crash of the giant hammers; the hissing of live steam as scale and surface accumulation is blown away; the swiftness and deftness with which the powerful hammer men handle the massive parts of red hot steel; the scorching blasts from the heating ovens, the sparks, the smoke; all the color and bustle of the picture must be left to the imagination.



### Between Shifts

Three shifts are kept in operation at the Obenberger drop forging plant. The big hammer man in the picture is boss of his gang, and is giving his hammer a look over to make sure everything is right. He just finished cleaning his working place with a deafening head of live steam.



### Cutting the Dies

The die maker is an artist as well as an artisan. His skill is almost uncanny. Into solid blocks of hard steel he cuts the pattern which under the hammer produces the dimension-perfect forging. As he guides the cutting tool rapidly and with apparent ease, it is hard for the onlooker to realize that every cutting of the tool must follow the relentless instructions of the blue print. It is not unusual for the cutting of the dies for a large automotive part such as a crankshaft to take from 100 to 180 hours.



### Giant Crankshafts Awaiting Heat Treatment

The big 6,000 pound hammers have been turning out crankshafts so fast that the heat treating department has been unable to keep up with the pace. As a result, you see the giant crankshafts piled up like cordwood. Hundreds of them in the pile. When you stop to think that every one of these shafts is so heavy that it is no easy job for two men to handle, you can appreciate the large scale of the operations by which these massive shafts are turned out in quantities like that pictured.



### Heat Treating

The husky workman has just taken a big shaft from the heat treating oven where it has reached a pre-determined temperature, and is ready for the plunge into water. There is so much smoke and steam attending this operation that the view is a bit hazy. The important effect of this operation is not seen by the human eye. It takes place inside the steel which is hardened and toughened.



### Testing Forging for Hardness

If too hard, the forging is machined with difficulty. If too soft, it has not the desired toughness and strength. It is very important, therefore, to keep accurate check on hardness, and a test is made of the forgings from every batch or "furnace" as it is called at the Obenberger plant. The chief tester and one of his assistants is shown in the picture, making a particularly important test of a big crankshaft.



# Service Managers Start Ball Rolling

Second Post War Convention of Factory Service Managers Drives Home Necessity for Closer Co-Operation Between Factory and Dealer's Service Man

INDIANAPOLIS, Ind., May 26—That there is a decided need for better contact between automobile factories and local service stations was one of the important thoughts coming out of the semi-annual convention of factory service managers which ended here to-day. Laying down a design on the drafting board in the factory and trying to keep a car built after that design running to the absolute satisfaction of the owner are two different things. Factory men have confined themselves too much with the supplying of repair parts and catalogs, but know too little about the discouragements and irregularities the automobile dealer's service manager is called upon to smooth out in his daily work.

Very often in a convention of this sort, the participants do not give vent to their real feelings, with the result that one has to wrest this information from them outside the regular meetings. Thus, some real facts in the matter are brought to light and the naked metal revealed without a coat of highly polished nickel. There is very often in a meeting of this kind too much talk devoted to efficiency and similar factors, but not enough to actual conditions as they exist in the field of maintaining motor cars. In order to bring to light the entire truth and to get the motor car dealer's service man's views properly presented we suggest that at another meeting of this kind there should be the same number of dealer's service managers as factory service managers. The writer talked with one dealer's service manager who said: "I would very much have liked to have talked at this meeting and told them something they don't know about service." And, unfortunately, that is the sentiment of too many of the men engaged in the actual servicing of motor vehicles to-day. There must be a dove-tailing of ideas between these two so the service problems of the country jointly can be solved.

The convention was held under the auspices of the service committee of the

*In subsequent issues of MOTOR AGE will be published extracts from the various talks delivered at the Service Managers' Convention, Indianapolis. These talks will be of much interest to dealers and service station men, inasmuch as they are vitally concerned with what the factories are doing regarding service.*

*Next week will be published the paper, "Functions of Ideal Service Department from a Sales Point of View," delivered by F. E. Moskovics.*

National Automobile Chamber of Commerce, which committee has been in existence but a short time, yet has begun to function with great rapidity. There were about one hundred and twenty delegates, with E. H. Herbig, chairman of the service division of the N. A. C. C.

acting as chairman. Some very good papers were presented, which brought forth much lively discussion. In fact, the discussions constituted the real meat of the session.

Relationship between sales and service departments were discussed pro and con, as were the flat rate, maximum estimate, approximate estimate, etc. systems of carrying on service work. Another topic that provoked much discussion was that of supplying service and stock parts for assembled cars and trucks.

It will be recalled that at the November meeting last year that the question of changing the Standard Service and Repair Parts policy was taken up and the Service Committee was at that time instructed to make the changes suggested in discussion and any others that the committee might see fit and to submit the policy at this meeting.

## Program of the Service Managers' Convention

### MONDAY FORENOON SESSION

1. Address of Welcome.
2. Report of Service Committee on Standard Repair Parts and Service Policies. By E. T. Herbig, Sales Manager, Service Motor Truck Company, Wabash, Ind.
3. Report of Service Department. By H. R. Cobleigh, Secretary.
4. Functions of Ideal Service Department From a Sales Point of View. By F. E. Moskovics, Vice-President, Nordyke & Marmon Company, Indianapolis, Ind.
5. What Service Department Expects Of and Owes to Salesman. By R. B. Perry, Service Manager, Allen Motor Company, Columbus, Ohio.

### MONDAY AFTERNOON SESSION

6. The Owner's Viewpoint as to His Responsibility and What He Expects in the Way of Service. By E. W. Turley, Manager, Service Department, Wilson & Co., Chicago.

7. What the Service Department Expects of and Owes to the Owner. By Henry R. Selden, Service Manager, Selden Truck Corporation, Rochester, N. Y.

8. Topics for General Discussion.

### TUESDAY FORENOON SESSION

9. Methods of Estimating and Charging for Service on a Flat-Rate Basis. By P. E. Chamberlain, R. R. Hall Cadillac Company, Denver, Colo.
10. Service Salesmanship. By B. M. Ikert, Editor, Motor Age, Chicago, Ill.
11. Y. M. C. A. Automobile Mechanic Courses. By H. M. Rugg, Supervisor of Technical Instruction, Y. M. C. A.
12. Topics for General Discussion.

### TUESDAY AFTERNOON SESSION

13. Repair-Shop Efficiency Methods. By H. G. Fitch, Service Manager, Willys-Overland, Inc., Toledo, O.
14. Discussion of N. A. C. C. Service Department and Its Proposed Activities.
15. Topics for General Discussion.



The service managers stopped talking service for a moment and had their picture taken

# The Standard Policy for Service and Repair Parts

*As Revised by the Service Committee and Presented at the Service Managers' Convention, Indianapolis, May 24, 25 and 26, 1920.*

## 1. Manufacturers' Square Deal Warranty

Satisfactory relationship between manufacturer and user is contingent upon mutual good faith. All manufacturers should guarantee to make good all their obligations expressed or implied which will assure each and every user the maximum of truck service and at the minimum of constant cost.

## 2. Distributors' and Dealers' Responsibility

The best maintenance results can be obtained with the user through distributors and dealers representing the manufacturer. The distributors' and dealers' service obligations are:

(a) To carry out the Manufacturers' Square Deal Warranty with the user.

(b) To maintain adequate facilities for making repairs, adjustments, and do general overhauling in a prompt and competent manner at reasonable charges.

(c) To thoroughly instruct the user in the proper care and operation of the truck.

## 3 Users' Responsibility

The greatest responsibility for satisfactory truck service rests upon the user. The responsibility of proper operation and care are entirely beyond the control of the manufacturer and distributor. Upon the user, carrying out consistently and intelligently the instructions on care and operation depends the success of truck service.

## DETAIL PRACTICES MANUFACTURERS' RESPONSIBILITY

### Replacement of Defective Parts:

(a) Within ninety days after delivery of a new truck to user, the manufacturer will furnish, free of charge at the factory or branch, duplicate parts to replace any parts that are returned to the factory or branch, with shipping charges prepaid, and which are determined by the company to have been defective in material or workmanship, or it will put such parts in condition as good as new without charge.

### Repair Parts Service:

(b) Discounts to independent repair shops will be subject to agreement between distributor or dealer and the repair shop.

(c) The manufacturer reserves the right to dispose, within thirty days, all parts returned, without assuming liability, unless covered by shipping instructions or adjustment is accepted.

(d) The manufacturer will refuse to consider claims for, or accept for adjustment, any parts not supplied by him.

### Accessory Service:

(e) For service and replacements on engine starters, batteries, magnetos, generators, carbureters, tires, rims or other trade accessories that are not made by the manufacturer of the truck, application should be made direct to the

nearest service station maintained by the maker of such accessory. While not assuming any direct responsibility for articles made by them, the manufacturer, its branches or dealers, will do all possible to assure the user of a square deal from the maker of these parts or accessories. If, however, the accessory dealer is not adequately represented in a particular locality, the dealer therein is obligated to give the proper service on such accessories.

(f) Manufacturers shall provide dealers with a list of manufacturers of accessories used on their trucks and a list of service stations.

## DISTRIBUTORS' AND DEALERS' RESPONSIBILITY

### Inspection and Adjustment:

(a) Trucks brought to service stations maintained by factory, branch or dealer will be inspected monthly without charge. The same service will be rendered at points outside of the service station at a regular charge based on the distance. Inspection includes examination and report by the inspector of his opinion of the condition of the truck.

(b) Necessary adjustments, to put the truck in standard operating condition, will be made without charge during the first month after delivery of a new truck to user, provided the truck has not been tampered with nor injured by accident, abuse or neglect. After the first month, adjustments will be made at the regular charges of the service station. Adjustment includes only such adjustments as the inspector has, in his opinion, found necessary to put the truck in standard operating condition.

(c) Every dealer is expected to give the same inspection and adjustment service on any truck made by the manufacturer without regard to the territory in which it was bought.

### Repairs, Replacements, etc.:

(d) All work not included in inspection and necessary adjustment or installation of replacements will be charged for at regular rates.

(e) When any charge work is to be done and the cost can be estimated in advance, the user, upon request, will be advised of the approximate or maximum amount of the charges before the work is begun.

(f) When it is necessary, for the convenience of the user, to render service at a distance from the service station, the time spent by employees going to and from the job will be charged for at the regular rates of the station, together with all proper expenses of making the trip, cost of shipping parts, if any, and other necessary incidental expenses.

### Overtime Work:

(g) Any overtime, holiday or Sunday work done upon the request of the user, will be charged for at the regular overtime rate.

## Instruction:

(h) On delivery of a new truck, personal driving and maintenance instructions will be furnished for a reasonable period without charge. All other personal instructions will only be given in accordance with the agreement between the customer and the dealer at the time of purchase.

## Repair Parts:

(i) The dealer will be required to maintain a minimum stock of both "current" and "service" parts as specified by manufacturer.

(j) The dealer will be required to furnish an inventory of current and service parts upon request.

(k) Stocks of parts shall be designed as follows:

1. **Current Parts**—All parts used in trucks of models being produced by the factory.

2. **Service Parts**—All parts for models no longer being produced by the factory and which have not been superseded by other parts that are interchangeable with them.

3. **Obsolete Parts**—Parts that have been superseded by other parts that are interchangeable with them.

## Return of Parts:

(1) Parts claimed defective must be returned to the factory with shipping charges prepaid, within ten days from date of replacement. The date when defect was discovered, manufacturer's number of the truck and owner's name and address must be given on a tag attached to part.

(m) Obsolete parts may be returned only by individual agreement with the manufacturer.

(n) Surplus parts may be returned only by individual arrangement with the manufacturer. All parts shipped to the manufacturer by dealer shall have transportation charges prepaid and be properly tagged.

The following five commonly neglected features of motor truck operation should be emphasized to the owner:

- Lack of regular inspection.
- Lack of intelligent lubrication.
- Loose nuts and bolts.
- Overloading.
- Overspeeding.

It is impossible to over-emphasize the importance of these matters which are beyond the control of the manufacturer and which the user must recognize to be in the nature of an obligation on his part deserving of the most careful consideration, if successful operation is to be maintained.

The manufacturer provides an efficient machine capable of successful operation for a period of years but when the truck is installed the responsibility passes to the user, as in the case of any other practical utility which cannot be of infallible construction.



# PECULIAR AUTOMOTIVE CONDITIONS IN KERN COUNTY, CALIFORNIA

Selling Cars Easy,  
but Overhead Cost  
of Tractor Sales  
Takes Almost All  
the Profits

BY FRED M. LOOMIS

**B**AKERSFIELD, Cal., June 1—Kern County, Cal., of which Bakersfield is the metropolis, is peculiar in as much as each industry is localized and may be considered as a potential trade unit. The methods employed by the dealers here to meet these conditions might not be applicable to many localities, while there are others in which such methods may have an appeal. The county covers some 8000 sq. mi. and the topographical profile is such that in two localities oil is produced in quantities, cattle are bred and raised in another, horticulture is in a locality by itself, while general agriculture and cotton raising each are more or less localized as to territory.

This makes for rather easy conditions in selling motor cars, but puts the tractor dealers under heavy overhead for selling. Those tractor dealers who have been long in the business here complain that at present commission discounts the overhead practically eats up the profits. The county being so large, and the various cultivated localities being so widely scattered, demonstrations and sales must be conducted at many miles distant from Bakersfield and this costs money. It is nothing unusual for a local dealer to be asked to demonstrate or deliver as far away as forty miles.

## Cotton Creates Tractor Demand

Furthermore, the agricultural and horticultural industries are not fully developed, and the result is that it is almost impossible to secure a large sales volume. In proportion to the area of the territory tributary to Bakersfield there are probably fewer tractors in use than in any similar area I have visited out here.

Something like two years ago the growing of cotton was undertaken in Kern County and the 1920 acreage is estimated to be about 25,000. This has started some demand for motor cultivators and some of the local tractor dealers already have introduced a few into the fields. It is the general impression that this will be a growing trade and the dealers are correspondingly elated over the prospect.



Top, the Bruce garage.  
Above, Bakersfield garage handles the Dodge

Ford sales and service station of  
George Habersfelde; above, L. D.  
Prough's establishment

There are six tractor dealers here. Three are automotive: George Habersfelde, Ford and Fordson; The Bakersfield Motor Co., Chandler and Samson; the California Garage, Overland and Elgin and a tractor line which just has been contracted for but which the company did not care to designate at this time. Two are implement concerns: The Karpe Implement House, International, and A. F. Stoner & Co., Cletrac. One is exclusive: Wirz & Theirer, the Wallis, the Toro cultivator and the Acme motor truck.

The situation is much more favorable for the motor car dealers. The proximity of the Bakersfield oil district makes a constant demand for motor cars and motor trucks which is in excess of the available supply. Perhaps the way in which the Bakersfield Garage & Auto Supply Co. meets this situation will be typical of the general attitude of the automotive fraternity. This concern handles the Dodge car and has an annual allotment of 250 cars. All of these and more could be sold to the oil companies, but the company allows only sixty percent of its allotment to go in that direction, reserving forty percent for sale to other sorts of buyers. Somewhat similar restrictions are placed on oil buyers by most of the other dealers.

In a way this operates as a hardship because sales to the oil companies are spot cash, while sales made to private buyers, as is the common custom in California, are made on the installment

plan. Nevertheless the policy of the Bakersfield automobile concerns is commendable since in the present stage of motor car production and disturbed transportation conditions they are doing what they can to take care of all classes of buyers and thus are sustaining their standing and prestige with all.

One thing especially noticeable about Bakersfield motor car dealers is that most of them have outgrown their service facilities. The town is booming and it is common talk that the facilities for service on motor cars has not kept pace with the growth of the business.

## Building and Adding Equipment

This promises to be repaired in the near future, however. As is the case in nearly all of the California towns I have visited, the automotive concerns here either are building new garages and service stations or they are making extensive additions to those they have. Considering the high cost of building at this time the activity in this direction displayed by the local concerns speaks well for the generally healthy condition of the motor car business here.

Bakersfield is doing much in this respect. The Bakersfield Garage & Auto Supply Co. has invested more than \$75,000 within the last two years in increasing its facilities. J. L. Bruce, selling the Buick car and the G. M. C. truck, moved into a new brick building



in March last which has ample provision for large tire and accessory stocks and which also has an exceptionally well equipped repair shop. The C. W. Williams Motor Co., Oldsmobile, Scripps-Booth and Columbia, also has a new building, while a \$50,000 shop and sales room is nearing completion for the Bakersfield Motor Co., which will house the Chandler car and the Samson tractor line. The California Garage moved into its new 122 by 150 ft. building last March and now has one of the best equipped establishments in town. The 122 by 182 ft. building occupied jointly by the George Elliott Garage, selling the Cadillac, and Witz & Thierer, with the Wallis tractor, also is new—so new, in fact, that these com-

panies just are getting settled. Practically the whole automotive industry here is getting into larger or new quarters.

Selling motor cars and other automotive equipment here is largely a matter of departmentization and specialization. The Ford and Fordson dealer has eight salesmen out, who differentiate their efforts and divide along motor car, motor truck and tractor lines. The Bakersfield Garage & Auto Supply Co. not only has its business departmentized under eight department managers, but it has zoned the county as respects sales and puts a specially trained man over each zone to work the class of trade which may be dominant in that zone. All degrees of spe-

cialization may be found among the other dealers.

Maybe the universal resort to specialization both in departments and salesmen may be due to the localization of industry previously mentioned, but even so the good effects are apparent. Furthermore, there is a cordiality and harmony among the dealers here one rarely finds. The local Automobile Trade association is a very live institution. It meets frequently in the ball room attached to the Bakersfield Garage establishment and as J. K. Thrasher, sales manager of that concern, says: "When you greet a man with a smile on your lips it's pretty hard to think of him any other than kindly."

## TOMORROW'S MECHANICS—Where Are They Coming From?

THE question suggests itself when one makes a survey of garage and service station conditions in a small city and small town territory, far from the centers where mechanical workers are trained in greater or lesser numbers in large service stations and schools.

A representative of MOTOR AGE on an investigating trip through nine

counties of Central New York saw many dealers lacking an adequate staff of competent mechanics and others with full staffs wondering what they would do when one of their men resigned. Dealers generally admitted that they were reluctant to go through the process of "breaking in" green men. Yet they confessed in the same breath to periods of inconvenience

when men quit their service stations to take positions in the small town or in other towns. Some of the dealers stated that there should be a general policy of keeping a green man in training to fill the next vacancy, but few seemed to be willing to undertake the trouble and expense, continuing to rely on the chance of getting a man somewhere when necessity arises.

In town after town were found dealers and operators of sizable garages with just enough mechanics to do the normal work of the day, and with overtime enforced whenever unexpected jobs came into the shop. Seldom was an establishment found with an extra man to fill in at rush periods and to prevent the shop from becoming undermanned when someone is sick or resigns. There was found considerable bidding back and forth for certain men with recognized mechanical ability and there was very little association co-operation among dealers in the way of stabilizing local labor conditions.

### Should Keep Man in Training

Conditions in a number of the central New York towns suggest that dealers could operate more efficiently and economically by investing in the necessary cost of keeping a man in training at the bottom of the mechanical staff than by resorting to the necessity of obtaining a man from a competitor's establishment, when a vacancy occurs.

Mechanics in the territory generally are being paid an average of 60c an hour, which compares favorably with many larger cities in the east. Service charges average \$1.00 an hour with efforts under way in several of the cities of 25,000 and up to increase the rate to \$1.25.

Another problem disturbing dealers of the central New York district is that of long hours in the garage. The demands of the motoring public have forced a good many establishments, especially in the smaller towns, to remain open until 9 p. m. and all day on Sunday. This condition has caused a good deal of dissatisfaction and com-

(Concluded on page 52)



The California garage sells the Overland and Cole; above, the Kern County Motor Co.

Top and center, buildings of the C. W. Williams Motor Co., selling the Oldsmobile, Scripps-Booth and Columbia Six; above, Paul Derkum's service station

# The Pneumatic Truck Tire

Some of the Problems Encountered When Changing a Truck From Solid to Pneumatic Tires. More Gear-Shifting Is Necessary Because of the Increased Wheel Diameter

BY DAVID BEECROFT

Directing Editor, The Class Journal Co.

IN truck operation where starts and stops are numerous there will be more gear-shifting with pneumatic tired trucks than with solids, particularly if the truck was designed for solid tire operation, and gear ratios were not changed when it was converted to pneumatic equipment. The reason rests with the changed gear ratio as the wheel diameters are increased by the pneumatic equipment as compared with the solids. This is equivalent to a loss of power and where it is not compensated for by a larger engine or changes in gear ratio in the gearbox or rear axle there must of necessity be more gear-shifting.

On a straight-away trip over level roads the pneumatic tired truck will not require more gear-shifting than the solid. In cities where traffic stops are frequent, and where greater speed is aimed at there must of necessity be more gear-shifting. When trucks are designed from radiator to rear axle for pneumatic equipment and gear ratios are arranged with pneumatics in mind and engine power is proportioned to speeds desired, then there will not be so much gear-shifting as there is on the present converted trucks.

## Twelve Per Cent Deflection Best

For the last six or seven years investigations have been carried on by tire concerns for the purpose of determining the proper load to carry on a giant pneumatic as well as the most desirable inflation pressures. Tests conducted by several of the tire manufacturers have shown that pneumatics give best results when deflected twelve per cent under a load. This means twelve per cent of the height above the rim. The deflection can be controlled by regulating the load carried or the inflation pressure, or both. This accounts for the sliding scale of recommended pressures as well as loads which Goodyear, Firestone and some other makers have published. Under this rule, if the inflation of a certain size tire be increased the load it carries can be increased up to certain limits. As an example, take the pressures given by Firestone for its giant pneumatics and the load variation. With a 10-in. tire, if the inflation is 100 lb., the load is 5000 lb. or less, which is permitted to be carried on the tire. With an inflation of 110 lb. the load is 5300 lb. per tire or less. If the inflation is 120 lb. the load is 5650 lb. per tire or less. If the inflation is 130 lb. the permissible load is 6000 lb.

Firestone is not in favor of carrying a maximum pressure unless the tire is carrying a maximum load, and cites as the reason that a percentage of the re-

silience which the pneumatic offers is lost if inflation is so high that there is not the proper deflection of the tire under load. On the other hand, where inflation pressure is too low, there will be excessive deflection resulting in internal friction, which will generate heat and prove a destroying factor in the tire, they hold.

The United States company sanctions no variations and no sliding scales. It holds that there is entirely too much decreasing of inflation; that it is impracticable to change tire inflation on trucks every time the load, and therefore, it has

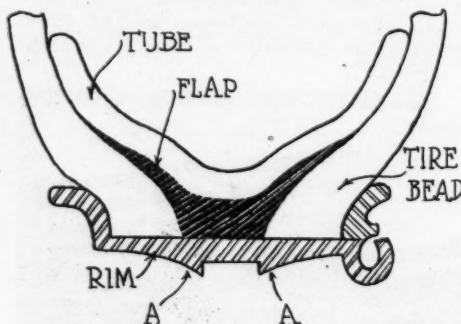


Fig. 1—A 40x8 rim cannot be fitted on a wheel intended for a 44x10 rim because the beveled surface A and A are different distances apart on the different sizes of rims. This prevents the overloading caused by fitting a tire of too small diameter

set definite figures for the pressure and load on the various sizes of tires. For instance, United States says a 10-in. tire should carry 6000 lb. when inflated to 130-lb. pressure, and prescribes this pressure for the 10-in. tire.

The scale is as follows:

Tire	Load	Inflation
4½ in.	1200 lb.	75 lb.
5 in.	1700 lb.	80 lb.
6 in.	2200 lb.	90 lb.
7 in.	3000 lb.	100 lb.
8 in.	4000 lb.	110 lb.
9 in.	5000 lb.	120 lb.
10 in.	6000 lb.	130 lb.

The United States experts hold that under-inflation is one of the greatest abuses of tires of all types, and that only by setting a definite inflation pressure and maintaining it, can the best results be secured.

Goodyear follows the policy of increasing the load as the inflation pressure is increased, with certain limits observed. It recommends a certain load with inflation pressures designated as furnishing best conditions under which

each tire should run, and slight variations are allowed above and below this recommended point.

There is one respect in which a pneumatic tire has an unusual advantage over a solid, namely, in that it contacts with a greater area of the road surface. It has been found, according to Goodyear's experiments, that what is known as the road contact area of a 7-in. solid tire capable of carrying a load of 4200 lbs. is approximately 28.2 sq. in., whereas the contact area of a 40x8 pneumatic tire, which will carry a 4000 lb. load when inflated to 110 lbs. pressure is 36.4 sq. in. Here is an increase of road contact area of 8.2 sq. in. for approximately the same load. This results in giving a lower unit pressure per square inch on the road surface for a pneumatic than for a solid.

This might be explained this way: The 28.2 sq. in. of road contact area on the solid tire carrying 4200 lb. means a pressure of 149 lb. per sq. in. on the road surface.

With the pneumatic having 36.4 sq. in. of road contact area, and carrying 4000 lb., there is a pressure per sq. in. of 110 lb. Subtracting these there is a difference of 39 lb. load on each square inch of road for the solid as compared with the pneumatic.

It is a correct inference to make that the pneumatic has a distinct advantage in this regard in that its lower pressure per square inch on the road should give less road wear and corresponding greater cushioning ability, for reducing vibration and sudden shock.

## Different Road Pressure

Solid tires will not all have this same unit pressure per square inch on the road surface, because different makes vary, depending on whether the tire is a soft compound or a stiff compound, and whether the contour of the solid tire has a flat top where it bears on the surface or more of a peaked one. A high peak will deflect more than a flat one. A small diameter tire will deflect more than a large diameter one, so that the above comparisons will not hold with all kinds of solid tires.

The following tabulation gives the air volume and shows that the load averages close to 1 lb. per cu. in. of air volume. These figures apply specifically to Goodyear pneumatics.

Tire size	Tire vol. in cu. in.	Load per wheel lb.	Load per cu. in. lb.
36 x 6	2056	2100	1.02
38 x 7	3027	3000	.99
40 x 8	3897	3500	.89
44 x 10	6686	5700	.85
48 x 12	8920	7800	.87



Fitting pneumatics to tires on trucks has called for the manufacture of a certain number of standard sizes of rims to take these tires. These rim sizes are the same whether used on wood or metal wheels. They are the same size whether the tire is mounted on a demountable rim or if the rim is not demountable from the wheel. There is an organization known as the Tire and Rim association, which has agreed on certain sizes of rims as follows:

34 x 5 in.  
36 x 6 in.  
38 x 7 in.  
44 x 10 in.

This organization is now proposing to standardize a 42 x 9 rim. The Society of Automotive Engineers has agreed on most of these standards, so that these can be considered the standard sizes of rims for giant pneumatics. Undoubtedly another rim size will be agreed upon if it is found desirable to make larger tires than 44 x 10 in.

In deciding upon these rim sizes tire manufacturers have endeavored to simplify by making it possible to use one of the standard tire sizes as an oversize on the smaller size rim. For example: On a 38 x 7 rim you can use a 38 x 7 tire as standard and a 40 x 8 oversize. Similarly on a 40 x 8 rim you can use a 40 x 8 tire as standard and a 42 x 9 as oversize. The following tabulation gives rim sizes in the first column, regular tire sizes in the second column, and over-size tires in the third column.

Rim Size	Standard Tire	Oversize Tire
34 x 5	34 x 5	36 x 6
36 x 6	36 x 6	38 x 7
38 x 7	38 x 7	40 x 8
40 x 8	40 x 8	42 x 9
42 x 9	42 x 9	44 x 10

The rim diameter in all of these sizes is 24 in., which has been agreed upon and means that all wheels for taking pneumatics on trucks of these sizes are of the same diameter. This has simplified the wheel situation as it is very desirable to have one diameter of wheel rather than several. It works for economy by the wheel maker and incidentally the truck maker, and simplifies matters for the truck operator. It is also fortunate that over-size tires are really standard sizes for the lower sized rim as indicated by the tabulation.

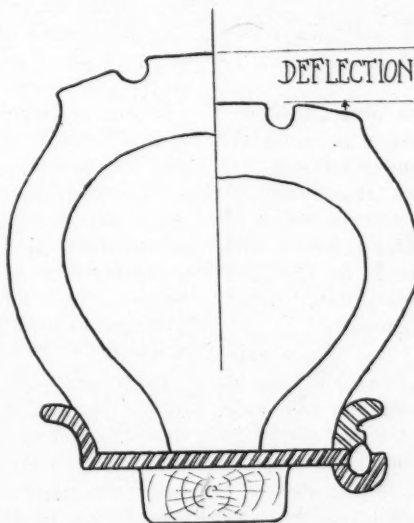
#### To Prevent Overloading

Although all wheels for truck pneumatics are 24 in. in diameter it does not follow that you can put a 40 x 8 tire on a wheel intended for a 44 x 10 tire. The tire manufacturer has seen to it that rims are not interchangeable, that is, you cannot fit a 40 x 8 rim on a wheel intended for a 44 x 10 rim. The reason for this is that the beveled surfaces A and A' on the inner face of the rim, Fig. 1, are different distances apart on different sizes of rims, and the wheel makers have had to machine corresponding surfaces on their fellows for these faces A and A' to bear upon, which makes it impossible to interchange different sizes of rims. Undoubtedly the tire maker considers this one of his important protections

against overloading by fitting a tire of too small diameter. There is a movement to have the beveled surfaces A and A' the same distance apart on all rims. It would simplify machining operations in wheel manufacture, but it is not certain as yet whether this will be done.

The question has been asked whether brakes are more effective on a truck fitted with pneumatics than on one fitted with solids, and if the braking area on a solid tired truck will prove adequate should the truck be converted to pneumatics without fitting larger brakes. Brakes are more effective on pneumatics than on solids. Undoubtedly the larger contact area with the road on the pneumatic is effective. There is not the danger in skidding with a pneumatic that there is with the solid. From hundreds of examples of converted trucks, that is changed from solids to pneumatics, brakes have given satisfaction. Brakes are generally conceded to be one of the weak links in motor truck design, and it is to be hoped that in the designing of trucks for pneumatic tires that the braking area will receive that attention due it. Many truck makers fitting pneumatic equipment are not altering the brake area, using the same as designed for solid equipment.

To-day the great demand for pneumatic is on the smaller-sized trucks, such as  $\frac{3}{4}$ -ton, 1-ton, 1½-ton and 2-ton. The demand does not stop here, but naturally tapers off for larger sizes, such as 3-ton, 3½-ton and 5-ton. Some manufacturers are equipping 100 per cent with



Tests conducted by several manufacturers have shown that pneumatics give best results when deflected twelve per cent under load. The deflection can be controlled by regulating the load or the inflation pressure, or both

pneumatics on the smaller sizes. One maker producing 1½ and 2½-ton sizes has fitted forty-three per cent with pneumatics in the last three months. Another manufacturer who is fitting sixty per cent of his trucks with pneumatics, reports the heavy demand on models up to 2 tons capacity. There are others fitting 100 per cent with pneumatics on all smaller sizes, including 2½ tons.

From those it should not be inferred that giant pneumatics are not being used on 3 and 3½-ton trucks. They are, but not in such great numbers.

There is a heavy demand for pneumatics from areas where road surfaces are not the best, such as the South and West. Some manufacturers report brisk demand from Florida, Texas, Louisiana, Nebraska, Oklahoma, Iowa, and other agricultural states.

Generally speaking, the great demand for the pneumatic comes because of the increased traction it affords. This argument comes ahead of speed on the part of those purchasing the trucks. There has been a heavy demand from the oil fields where road conditions are not good.

Dealers must beware of possible difficulties lying ahead in the selling of pneumatics for all kinds of conditions. The hard-headed business man will not take up the pneumatic in all sizes unless it can be proven to him that he gets a lower operating cost per truck mile, all factors being taken into consideration, with the pneumatic than with the solid. The dealer must keep this thought constantly in mind. Do not commit the error of overselling the job. Giant pneumatics of many sizes will come into permanent use only if it can be proven that they reduce the cost per truck mile of operation.

#### Keeping Account of Cost

There are exceptions to every rule. There are instances where roads are such as not to permit using the solid tire, in which case comparisons of cost between solids and pneumatics cannot be made. This is one of the examples of where the pneumatic is revolutionizing the truck field. It is an example of how truck use can be extended beyond the possibilities with solids.

Tire manufacturers are taking the wise precaution of using their influence to get truck fleet owners to install a cost accounting system by which the truck operators will have a definite record or cost. One tire company has a corps of men endeavoring to introduce such a cost system. This company undoubtedly recognizes the fundamental fact that the giant pneumatic will not permanently endure so far as equipment is concerned unless it reduces truck mile cost.

When tire manufacturers and truck manufacturers do not agree on all matters relating to giant pneumatics, it is not to be wondered that dealers and fleet owners will have their problems. One manufacturer is opposed to the idea of selling pneumatic tired trucks because they will give greater speed, as he believes this is not the strongest argument for the truck in its present state of design. To get greater speed without increasing the cost of obtaining that speed, which means increasing the upkeep cost, it will be necessary to use lighter engines, lighter truck parts, and to employ different gear ratios in the gearbox and rear axle. This manufacturer believes thoroughly in pneumatic tires because they give increased trac-

(Concluded on page 31)



# EDITORIAL



## Bolshevism's New Shirt

THE bolshevist, as most of us understand him to be, is an individual who would bring everything to a common level—and generally he is not a bolshevist unless he can benefit himself personally by the leveling. In other words, he can't get up so he wants everybody else to come down where he is. He can't create wealth for himself so he doesn't want any one else to have any. His plan is a lot like cutting all the corn down to the level of the backward stalks, and his result is about the same. A real corn crop is secured when every stalk is given every chance to do the best it can.

One thing many of us do not realize is that there are many varieties of bolshevist. Many of them are not recognized because they are running around in a new shirt. In other words, because they do not fraternize with the horny-handed bolshevist they are not recognized as such. But their net results would be the same.

The other day in a newspaper in a city on the Great Lakes a newspaper, which uses big type and likes to print on green paper, appeared an editorial which for sense and facts is about as heavy as the average bolshevist in the managerial positions he wants no one else to hold. This editorial said:

### "BUY AN AUTO"

"Raise the price of sugar a cent or two and one hears a howl that can be heard from one end of the country to the other.

"Raise the price of an automobile \$10 and promise immediate delivery and the prospective purchaser will smile all over, hand across the money and call the dealer blessed.

"Among the causes for H.C.L. is not the automobile so much as the insatiable demand for them. Larger sums of money are spent with less concern and greater freedom, and by more people who have no business doing it, on the purchases of automobiles than on any other single article. Next, and far down the list, come musical instruments.

"Carpets are hard to get and very costly. Yet every auto has a rug or two. There is a shortage all down the line in metal products, yet springs and parts for autos pile the loading platforms at lake cities like Cleveland and Detroit. Plenty of chassis, but a scarcity of bedsteads! Newspapers were put to it to get paper to print on, partly because Detroit, one of the gateways from the Canadian mills, was clogged. Detroit is primarily an auto-making town.

"Human beings are curious folk. They will pay any price for a motor car, even though it takes the labor which might build houses or make beds or furniture or hardware or railroad transportation. Buy an automobile. Sure, the top will shed the water of the rainy day to come."

And having gotten that out of his system the editor of the newspaper probably feels better. Also, he probably feels he has done his country a service with a line of "hot facts." As to the latter, he is right. They are "hot"—but not facts.

It is beyond the comprehension of thinking men how a newspaper can continue to function in a community and at the same time operate in a way that is far from being constructive and which can spread such damaging, deceptive and dangerous information among people who are too prone to accept what newspapers say as fact.

The editorial writer does not display a knowledge of the present situation. He has not gone into the real situation as regards finance, labor, transportation and materials. When transportation is the crux of the situation he would shut down the manufacture of transportation. He condemns Detroit, because it is making the trucks which have made possible the movement of the paper on which this issue of MOTOR AGE is printed. And probably if some one would shut down the country's greatest finished-product industry this editor would be able to buy a vanadium steel bed.

Of course, there is no use asking him what would happen to the thousands of families in Detroit, with homes partially paid for, were their jobs to be taken from them. Under his system they would be expected to show up serenely the next morning at the Baldwin locomotive works in Philadelphia and live happily ever after.

The present national economic difficulty is going to be untangled. There is going to be a lessening of buying in many lines. There is going to be a readjustment of labor, which will soon be seeking the job rather than the job seeking the man, there is going to be a readjustment all along the line—and every man, woman and child and every trade and industry will contribute its part. But no single industry is going to be called upon to exterminate itself. That would be disastrous.

Civic life is built around local industries, and these industries must and will continue, no matter what they may be. The prosperity of this country has been the spinning wheels of its industries—and they must continue to spin, with a slight readjustment. It is these wheels which in many ramifications produce all the things that let all of us live, and no one wheel can be disturbed without the whole being in some way affected.

The editor may have been seized with that peculiar malady which has been prevalent during the last few years, which causes folks to class the motor car as a luxury. A shop mechanic may spend hundreds of dollars in dressing up his more or less non-essential front lawn and the community will praise him, but if he buys an old used car he is condemned.

In these days, when common sense seems to be getting rather uncommon, it is the duty of all of us to make ourselves heard when the destructionist tries to sell his wares as facts. When folks get to ranting about shutting down industries, and so forth, ask them for a more detailed explanation of their plan. We have heard many soap-box orators, and never yet heard one who did not say, when pressed for details of the working out of his plan, that that was something which would have to be figured out later on. The Russians tried it—and it didn't work—because the Russians quit working.

When civilization ceases to progress and it is no longer necessary for men to move from place to place the motor vehicle will cease to be a necessity. And until that day the need is for men who will formulate plans for DOING things. There is not now and never will be a place among us for the man whose idea of progress is to STOP doing things.

We shall all take our part in the readjustment, and if we keep our heads and WORK and BUILD instead of trying to TEAR DOWN we shall come through that much more quickly—and better.

Be a flywheel—not a brake drum.



# Real Gasoline Famine Hits California

## In Some Places Only Three Gallons at a Time May Be Purchased and in Others None at All Is Available

**S**AN FRANCISCO, Cal., May 28—California is suffering today from a gasoline shortage, which in some places is so acute that you can purchase only three gallons at a time. The shortage is more acute in northern California where in places there it is difficult to secure gasoline at all. This is largely in the rice group areas. The present shortage does not give immediate evidence of tying up automotive transportation on the Pacific Coast as the oil companies foresaw the coming shortage as far back as January and February and at that time began laying plans to meet it. The shortage exists from San Diego at the Mexican line right through the state to the northern boundary but varies in different places.

### Switchmen's Strike Immediate Cause

The switchmen's strike has been an immediate cause, but there are other reasons, the most important being that the increase in automotive apparatus on the coast has run ahead of the supply of crude and petroleum reserves in storage have been drawn upon very heavily for many months. Before the peak of consumption in July is over these reserves will be much more depleted. This year California will have to import 80,000,000 gallons of gasoline from east of the Rockies. In 1919 there were 20,000,000 gallons imported from the East.

The development of the paved highway system today approximating 4500 miles of the finest roads in the country has had a wondrous stimulating effect on the sales of automotive apparatus. The increase of motor cars in 1919 was 33 per cent over 1918 and an increase of 25 per cent is expected this year over last year, which increase would be much greater were coast dealers able to secure shipments. Don Lee, Cadillac distributor for California, has 2000 orders with deposits on his books which is practically a year's shipment. Two or three other companies are three and four months behind in deliveries which fact will reduce the car increase per cent as compared with last year.

### Take Distillate Off Market

Taking distillate off the California market last January was the first intimation of the impending fuel crisis. Distillate, which was never marketed in the East, is a fuel which lies between gasoline and kerosene. A gallon of crude oil produced less distillate than it would produce kerosene and the withdrawal of distillate was to increase the available supply of kerosene. Since January tractors and trucks that used distillate have been and are still being converted to using kerosene by use of the Ensign and other carbureting devices for using kerosene.

The withdrawal of distillate from the

BY DAVID BEECROFT

market was followed in February by announcements from the Standard Oil Co. of California that will 475,000,000 gallons of naphtha products were needed in California above last year. 600,000,000 gallons will be needed this year. In February the crude oil production in California was 25,000 barrels less than requirements.

To this excess of demand over supply must be added the fact that California is drawing heavily on storage reserves. Since 1916 reserve stocks have decreased 141,000,000 barrels and today the reserve of crude is but 30,000,000 barrels, and of this only 14,000,000 barrels are available for the market. 10,000,000 barrels are described as working capital, or merchandise on the shelf for sale, and the remaining 6,000,000 barrels in pipe lines, and tank steamers and so are entirely unavailable.

In March standard prices were advanced two cents a gallon on gasoline and twenty-five cents a barrel on crude.

Each month sees the reserves still farther depleted. At the present rate of consumption and production the available reserves will be exhausted in twelve months. Those in the oil industry view the situation with alarm, as the situation is not a temporary one, but rather a culmination of a steady growth.

### Preserves Being Exhausted

The fuel oil situation grows proportionately serious as reserves are exhausted. California is a state without coal. Perhaps no other state in the Union is more unfortunately situated with regard to coal. Fuel oil has taken the place of coal being very extensively used as fuel on railroads, on boats and in manufacture. In twelve months when the petroleum reserves are approaching exhaustion California will see its users of fuel oil cut off from 25,000 to 30,000 barrels per day.

The present demand for more gasoline and more kerosene on the coast is calling for the use of the Burton cracking process in gasoline distillation and while this nearly doubles the quantity of gasoline obtained from a gallon of crude it practically leaves no fuel oil, so that as gasoline supplies are increased by cracking processes fuel oil is eliminated.

The war has brought an increased demand for fuel oil, the Navy wants practically twice as much this year as last. Here are the figures:

1919 Navy used 1,532,550 barrels fuel oil.

1920 Navy wants 2,950,800 barrels fuel oil.

For 1920 the Shipping Board wants 4,000,000 barrels.

See how the daily consumption of fuel oil has increased.

1918 average daily consumption 279,576 barrels.

1919 daily consumption last six months 292,278 barrels.

1920 January daily consumption 301,100 barrels.

1920 February daily consumption 304,120 barrels.

The new \$10,000,000 Standard Oil refinery now being built to use the Burton cracking process while giving more gasoline will cut down the supply of fuel oil 30 per cent or approximately 20,000 barrels per day.

### Advise Economy in Fuel Use

In view of these figures it is not surprising that a fuel crisis exists in the state. The oil companies have been advertising to use less gasoline within the last few weeks. You see in many retail gasoline stations the following poster.

#### TO THE PUBLIC

The gasoline shortage is acute. Buy as little as possible. Use only what you must. Waste none.

#### TO SERVICE STATION OPERATORS

The gasoline shortage is serious. Conserve the supply. Waste none.

(Standard Oil Co.) California.

It is estimated to-day that of the 12,000 farm tractors in California, 7000 are already capable of using kerosene. There are many using gasoline and the oft-heard dispute of it being cheaper to use gasoline than kerosene is heard the same in California as in Kansas or Nebraska. The two conspicuous exhaust is indisputable testimony of poor combustion.

### Meet the Situation Calmly

Notwithstanding the present fuel crisis there is not much panic, if any. A few rice growers in the northern end of the Sacramento Valley, such centers as Marysville and Chicago, are worried, but it is certain that tractors or trucks will receive first supplies and that rationing of fuel by the retailers will be based on this consumption. For ten days it is not being possible to buy gasoline in some of these rice areas for car use.

With a local shortage here the strong oil interests are preparing to meet the exigency by importing from the eastern field. Upwards of 80,000,000 gallons will be imported by the Standard Oil Co.

This company in its May bulletin gives the reassuring information that "there will be gasoline enough to go around if the consumption of the passenger vehicle, as contrasted with the commercial or industrial vehicle, is curtailed 20 per cent or is driven 80 instead of 100 miles."

## To Ask Congress for Federal Good Roads Department

WASHINGTON, May 29—Recommendations of the Senate committee on postoffices and post roads for the creation of a federal highway commission will be submitted to the Senate within a few days. Senator Townsend, chairman, has announced that the committee has agreed not to ask the present congress for the appropriations necessary to construct a national highway system. Instead, they believe it advisable to appoint a commission, along the lines, proposed in the introduced bill by the chairman in December. They also propose to consolidate the Bureau of Roads with this new commission.

The Senate committee has been conducting hearings on the Townsend bill for several days. Members of the committee were quite convinced that the time was ripe for the federal government to extend its aid and link the highways of the nation. In order to expedite the work, they have concluded that the commission could function more properly at this time with the authority to make all the necessary surveys and maps in connection with the establishment and maintenance of a national highway system. The commissioners would be obliged to follow the same course in event the bill making the appropriations

was passed at this session. Inasmuch as it is impossible to get action with only a few days remaining before adjournment, the Senate committee will start the preliminaries with a report for a commission, to be appointed immediately.

The proposal to remove the Bureau of Roads from the control of the Department of Agriculture came as a distinct surprise to officials of that organization. Senator Townsend stated that it was purely in the interests of efficiency and economy that the committee considered such a recommendation. At the hearings this week, he sounded the opinion of the representatives of the American Automobile association, the National Automobile Chamber of Commerce and the leading highway engineers. According to the records of the committee, the overwhelming majority were in favor of consolidation.

Spokesmen for the automobile organizations declared the consolidation with the proposed commission would place the services of the trained personnel of the Bureau of Roads under the supervision of a new body which would require a staff of experts. The employment of the Bureau of Roads would materially reduce the amount which must be appropriated to carry out the survey. It is expected that the Department of Agriculture will put up a stiff fight to prevent the transfer of this important branch to a special and permanent commission.

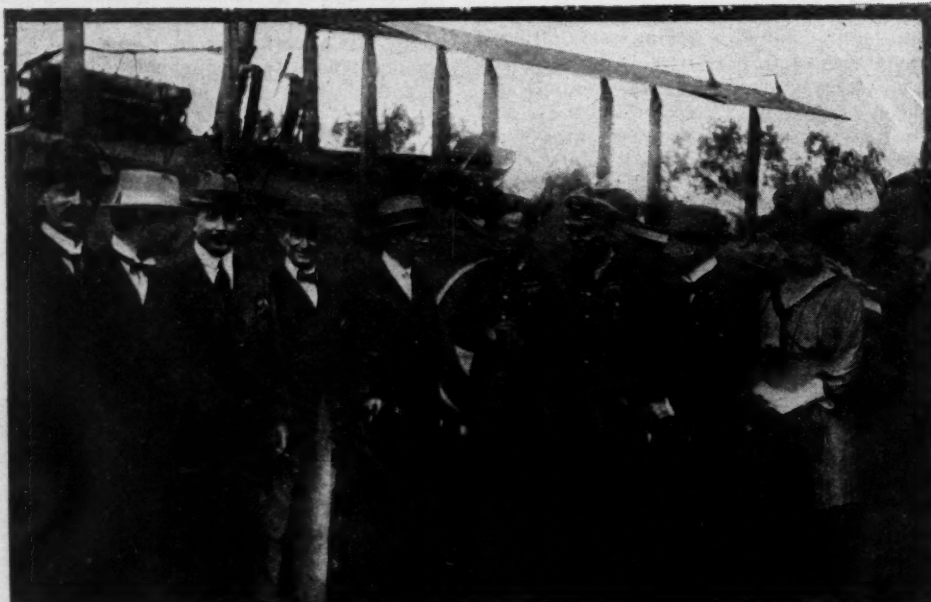
The inquiry into the feasibility of the Townsend bill for good roads will continue two or three weeks, Senator Townsend announced. He intends to call all interested parties in commerce and in governmental work. The witnesses this week were M. O. Eldridge, director Road Activities, A.A.A.; George C. Diehl, chairman Good Roads Board, A.A.A. and Henry G. Shirley, former state highway commissioner of Maryland and now with Federal Highway Council.

### RAISE CAR STORAGE RATES

Spokane, Wash., May 30—Automobile storage prices in Spokane are due to be increased as the result of a conference between proprietors of eight downtown garages. Universal storage rates prevailing are now \$10 per month for garage stalls and 50 cents a night for transient cars. These prices are to be raised to \$12.50 a month for resident owners and 75 cents a night for tourists. The increasing cost of labor, oil, lubricants and rentals is given as the cause.

### RECIPROCAL LICENSES WITH CANADA

Washington, May 28—Visiting motorists will not be held up in Canada by strict license laws as a result of the passage of the Motor Vehicles Act and a reciprocal agreement with Ontario entered into by thirty-three states. The establishment of an inter-provincial license exchange under which Ontario license plates displayed on a car owned in the province can be used in any other province also simplifies mat-



Lieut.-Col. Van Ryneveld and Flight Lieut. Brand of the British air service recently were granted a prize of \$25,000 by Parliament in recognition of their feat in flying from Brooklands, England, to Cape Town, Africa. Above is a photograph of Col. Van Ryneveld at the start of the flight and below are the two flyers on their arrival in Cape Town



ters for the American motor car owners.

The exchange agreement allows the Canadian motorists certain exemptions. The privilege as to license plates varies from three months in the case of Nova Scotia, Ontario, Quebec and Ontario to twenty days in Alberta. A visitor is required to register the car in event he overstays the legal period. In addition, he must pay the full annual fee and display the number plate of the province he is visiting.

The American consul has directed attention to the difference in the reciprocity agreement between Ontario and the thirty-three states and the understanding with the other provinces. Tourists from the United States are the only one exempt from registration. When entering from Quebec and other provinces, it may be used for business purposes as well as touring. There is a thirty day limit on the privilege accorded to American motorists.

#### AD MEN TOUR TO CONVENTION

Seattle, Wash., May 30—Two notable achievements in motoring have been recorded by the Pacific Coast caravan of advertising men and motor car dealers, which has just completed a journey of 1,200 miles down the Pacific Coast from this city to Stockton, Cal., to attend the coast convention of advertising men.

One hundred and fifty delegates accompanied the caravan, which comprised more than forty cars and trucks. The schedule down the coast was maintained to the minute, and all cars remained intact as an operating unit. Only six blow-outs occurred on the trip, and the service car was called upon only once.

The caravan was led by an Overland pilot car, and was preceded by J. G. Fenton, secretary of the Eldridge Buick Co., of Seattle, in the official scout car. The same company furnished the service car as far as Portland, Ore.

## Lax Enforcement of Laws Cause of Car Thefts, Says Indiana Judge

INDIANAPOLIS, Ind., May 29—Responsibility for the wave of automobile thefts, with which the state is beset was laid directly to lax state courts, the state pardon board and Gov. James P. Goodrich, by Judge A. B. Anderson in Federal court to-day.

Eight defendants, most of them mere boys, faced the court on charges of stealing automobiles and transporting them from Indiana to other states or vice versa.

Among them were Elwood Uncapher and Cecil Ruff, two Indianapolis lads, both aged 17.

They stole an automobile in Dayton, Ohio, and drove it to Richmond, Ind., last May, they confessed.

When the boys were sentenced to serve eighteen months each in the Federal penitentiary at Atlanta, Ga., the mother of one of them, who was sitting in the rear of the courtroom broke into sobs.

Kindly the court directed that she be taken from the courtroom, and then, his eyes flashing fire he broke out:

"You see, this thing has been going on for years and years, and the time has come when I've got to speak out.

"I'm going to say why I have to do things like this," with a glance of sympathy for the heartbroken mother, who was still sobbing in the corridor.

"I'll tell you why I have to do these things.

"It's because the state courts will not do their duty, and it's because when they do it and send guilty men to prison the governor turns them out. It's because when a man is convicted either the governor or the parole board, or somebody, I don't know who, turns him out. And it's about time the people knew it.

"That's why this court is turned into a police court," and, as if by way of an afterthought, the court added significantly, "and a criminal court."

"Term after term, year after year, these things have been going on here with nothing being done by the state courts to check them, so that we have the spectacle of these mere boys engaged in such business."

Judge Levisi, 21, and Clifford H. Vanderburg, 22, whose last place of residence was Muncie, admitted that they stole an automobile in Muncie April 21, and drove it to Dayton, where they were arrested.

Levisi admitted that he had served eighteen months of an indeterminate term at Jeffersonville reformatory on a charge of vehicle taking.

"That's a reformatory down there?" the court queried with emphasis on "reformatory."

The prisoner replied in the affirmative. "Suppose they had experts to examine your head and determine you were reformed?"

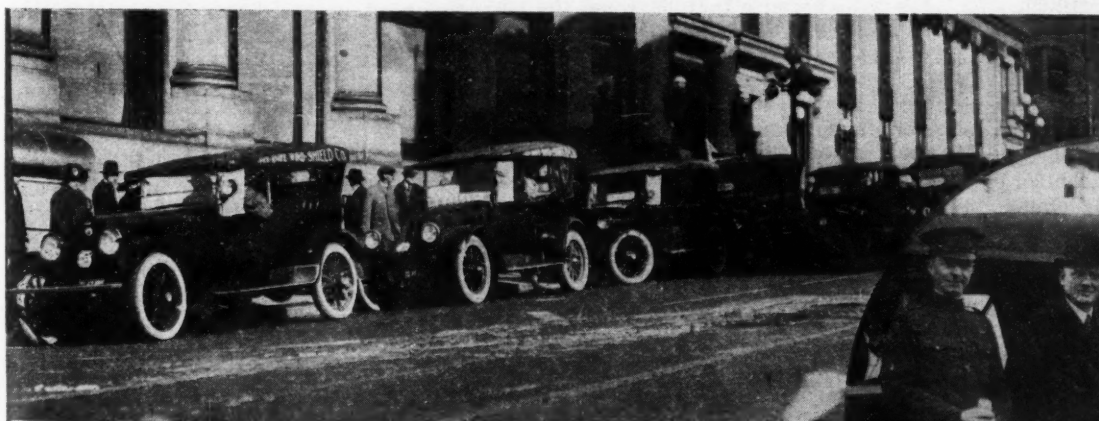
"Oh, yes, sir."

The court wanted to know who examined him and Vanderburg, the other prisoner, who also was released from Jeffersonville before completing a sentence on the same charge, glibly responded with the names and addresses of the parole board of the prison.

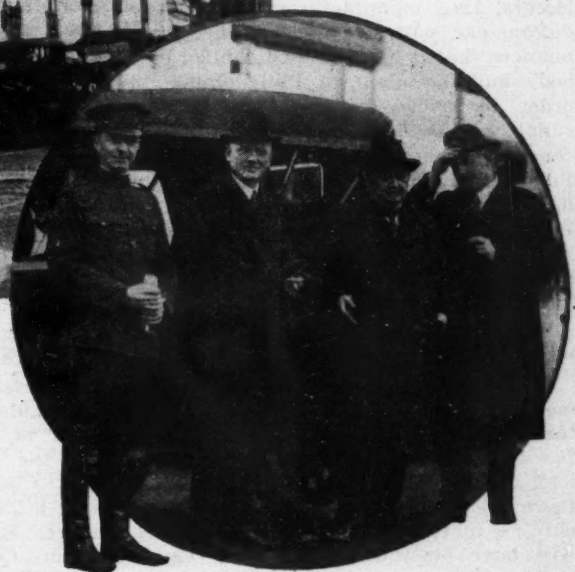
"Yes," the court mused, "we've had quite a number of the graduates of that parole system in this court recently."

When the general titter had subsided, Judge Anderson asked District Attorney Frederick Van Nuys:

"You don't seem to think much of that parole system, Mr. Van Nuys?"



Forty cars made up the caravan of advertising men who recently journey by motor car from Seattle, Wash., to Stockton, Calif., for their convention



"Well, sir, I don't," the district attorney replied.

"I don't think you think much more of it than I do," the judge remarked.

Others sentenced on pleas of guilty to charges of car stealing, were Omer Taylor, age 22, and Homer Deering, age 20, both of Indianapolis, eighteen months each; Ralph Rodea and Horace M. Jackson, Hammond, age 20 (colored) Detroit, eighteen months.

#### DEALERS CATCH CAR THIEVES

Detroit, May 28—Stolen cars recovered in Owosso, Mich., through the arrest of Clarence and Allen Somers, automobile dealers there, and four Italians, are being brought to Detroit for identification, if possible, by the owners. Trouble in identifying the cars is expected to result from the fact that the engine and factory numbers have been altered.

Suit was filed by several used car dealers in Owosso this week, tying up about \$15,000 belonging to the Somers brothers, who, according to police have admitted receiving the stolen property and participation in the theft plot. Used car dealers, who purchased cars of the Somers brothers and re-sold them, were compelled to give back the money paid by customers, when the machines were taken away by the police after the alleged confessions of the Somers brothers.

Four more stolen cars said to have been sold by the two Somers were located yesterday, making a total of forty-six recovered since their arrest. The Owosso plot, declared by police to be one of the biggest ever uncovered, and it is believed that the forty-six cars located are but a small portion of the cars stolen in and around Detroit, which are believed to have been handled through the Italians under arrest and the Somers brothers. In many instances insurance companies already have paid theft insurance on the cars stolen.

#### DuPONT GETS BODY PLANT

Wilmington, Del., May 28—DuPont Motors, Inc., manufacturers of the new duPont car, with headquarters here, announces that it has obtained control of a body building plant in Philadelphia, in order to insure distributors an ample supply of closed cars. The name of the concern has not been divulged. The duPont Co. now has its only plant here, but it is constructing a new one at Moore's, Pa., on the outskirts of Philadelphia. The touring car and roadster bodies are now being built in Springfield, Mass.

#### FRANCE SELLS 52,000 U. S. CARS

Paris, May 3—According to a statement made by the Minister of Finances, there have been sold 52,000 of the 70,000 automobiles left by the American Army in France. In consequence there are only 18,000 more to sell. According to the same authority all sales will have been completed this year.

### Louisiana-Mississippi Men to Meet at Gulfport Oct. 6

#### Two Day Convention Is Planned for Southern Automotive Dealers in Resort Town.

NEW ORLEANS, La., May 28—The Louisiana-Mississippi Automotive Trades Association will hold its fourth semi-annual convention in Gulfport, one of the prettiest summer resorts of the Mississippi coast, Oct. 6 and 7. Reports to C. U. McDowell, general manager of the association, indicate that three-fourths of the men in the industry in Mississippi will be represented at this convention. These meetings are held alternately in each state, the last having been held in Lake Charles, La.

The automobile dealers of Vicksburg, Miss., 100 per cent strong, have formed an association and affiliated with the Louisiana-Mississippi organization. The Monroe Automobile Dealers' Association is the latest of the Louisiana associations to come to it. Like the Vicksburg bunch, Monroe is also 100 per cent, every dealer in town having "joined up." Practically nine-tenths of the men in the automobile industry in northern Louisiana is now a member of the Louisiana-Mississippi body.

#### DEALERS GIVE ORPHANS OUTING

Boston, May 28—The Boston Automobile dealers' annual outing for unfortunate children is to be bigger than ever this year, according to the plans of Chester I. Campbell. He says that at least 500 cars will be necessary to take care of all the youngsters that he plans to take to Nantasket Beach on Wednesday, June 9.

Each year the Boston motor dealers supplied the larger number of cars for the outing. This will not be possible this year because they have not the machines. Therefore the motor owners will have to be a bit more generous.

The affair is non-sectarian. Creed or color has no part in giving youngsters one great joyous frolic. Each year the occasion has been a bigger success than preceding events. Therefore, Mr. Campbell wishes to have everyone possible notify him at 5 Park sq. that his or her car will be available for the outing. Those who have no car, but wish to make little hearts glad can send a check to help pay for the good things which the children eat. Moreover, he wishes to know quickly. So he urges that all those who can help him write or telephone him at once.

#### OPEN NEW SERVICE STATION

Nashville, Tenn., May 29—In the remarkable growth of the automobile business at Nashville, the eastern section of the city on the east side of the Cumberland, has to some extent hitherto been neglected, but not any more. Branch No. 3, of the Hippodrome Motor Co. was formally opened this

week. As a service station it will be convenient not only to the residents of East Nashville but to those in the section about the Public Square, just on the other side of the river in the city proper. The exterior of the building does credit to East Nashville and the interior arrangement is that universally a characteristic of a Ford agency. James G. Killibrew has been appointed manager of this branch of the Hippodrome Motor Company. Well lighted show and sales rooms are on the Woodland street side, the motor entrance is on Second. Ford cars and one-ton trucks will be found here.

#### NEW LAFAYETTE DISTRIBUTORS

Indianapolis, May 26—Cleveland, St. Louis and Atlanta distributors for the LaFayette car have just been announced by E. C. Howard, vice-president of the Indianapolis company, manufacturing the new eight-cylinder car designed by D. McCall White.

The Cleveland-LaFayette Co., to be located in a new building at Seventieth and Euclid, will give the LaFayette exclusive representation in Cleveland. Douglas L. Gardiner, president, recently resigned from the Cleveland-Cadillac Co.; Howard Drakeley, vice-president and general manager, comes from the Stearns organization; E. L. Mason, vice-president of the Cleveland Trust Co., has an active interest as treasurer; and Frank R. Marvin, of the law firm of Gage, Marvin and Dawley, will act as secretary.

The new LaFayette-St. Louis Motor Co. is headed by S. W. Ramsey, as president, and W. H. Tyler, as general manager. Mr. Ramsey has distributed Nash cars in the St. Louis territory for eleven years.

The LaFayette Distributing Co., of Atlanta, is under the management of L. L. Halle, who recently resigned as sales manager of the Atlanta Cadillac Co. R. H. Losey, the president, is widely known as head of the Losey-Nash Motor Co., Nash distributors in Indiana, and of the Southern Nash Motor Co., which controls the distribution of Nash cars in seven southern states.

#### U. S. WORKING ON FUEL PROBLEM

Washington, May 26—Evidence that the United States government intends to co-operate with the automotive industry in holding down the price of gasoline and oil continues to multiply. The Bureau of Mines has advised gas companies manufacturing illuminating gas to adopt another method which will not hinder the efforts of refiners to improve the gasoline supply. The Navy Department in awards announced to-day for 5,200,000 barrels of fuel oil has allowed slight modifications in its standard specifications in order that Mexican crude oil could be utilized on a larger scale. The awards give the Navy 15,792,000 gallons of gasoline for the coming year with options for contract renewals to insure delivery of 3,000,000 barrels of oil and 15,792,000 gallons of gasoline as a minimum for the following year.



Notice has been sent to the artificial gas companies that it is essential for these users of oils to develop other processes. Director Van Manning of the Bureau of Mines has suggested that it would help matters along to abolish the candlepower standard for illuminating gas. He points out that it is obvious that gasoline users will pay more for distillate gas oil than these companies could afford with present gas rates. The director explains the oil shortage as follows:

"The principal reason for this shortage has been the development of cracking processes whereby this oil is manufactured into gasoline to meet the increasing demand from the automobiles. The number of automobiles, trucks and tractors being put into service is increasing with such tremendous strides that it has become necessary to use more and more of the gas oil for cracking purposes. And as it can be anticipated that this demand will increase rather than diminish, the question of supply will grow more instead of less critical.

"Gas oil or distillate fuel oil is only one of the fuel oils now on the market. Some fifty-five per cent of all petroleum produced or imported into the United States is consumed as fuel or gas oil. Of this the larger proportion is the heavy tarry oil, which is variously termed residuum, reduced crudes, topped oils, bottoms or heavy crude. Along the Pacific coast and among the western states, this heavy oil has been used for many years making artificial gas, and can also be used for enriching gas made from coal or coke, though it has qualities which make it less desirable than distillate gas oil. At the present time this heavy fuel oil is not being cracked to any considerable extent in making gasoline, but is being used mainly in steam plants and for heating. There is, therefore, a large quantity of heavy fuel oil available for gas making."

#### PEORIA WANTS CITY GARAGE

Peoria, Ill., May 28—Agitation has commenced here for the erection of a municipal garage which will provide for temporary parking facilities for automobiles. The private garages are unable to take care of the thousands of cars that are daily parked and the streets are becoming congested. There is an average of 3,000 parked daily in the business district and each month shows an increase with greater difficulty in finding a place for storage. It is proposed to park cars along the levee, charging a small fee for the privilege.

#### GETS YEAR FOR CAR THEFT

St. Louis, June 2—A year and a day in the Federal prison at Fort Leavenworth, Kan., was the penalty assessed against Roy McBride of Louisville, Ky., the first man indicted here under the new Dyer act, making it a Federal offense to transport stolen motor cars from one state to another. He pleaded guilty to the charge of transporting a stolen car from Louisville to St. Louis.

## Cincinnati Dealer Seeks to Enjoin Striking Mechanics

### Dodge Distributor Charges That Coercion Has Been Used to Prevent Men Working.

CINCINNATI, O., May 28—Charging that Automobile Mechanics Union No. 1042 is attempting by coercion to change its "open shop policy" by visiting homes of employees and threatening them, the Mason Towle Co., Dodge distributors, has filed suit in Superior Court for an injunction against the union and its officers.

Eight different methods of alleged coercion are cited. Employees, the suit alleges, are annoyed, attacked and intimidated on their way to and from work, while one man, it is charged, was taken to union headquarters and threatened with bodily harm if he refused to become a member of the union.

The suit is the first legal action growing out of the strike of 700 automobile mechanics in Cincinnati garages several weeks ago. Several similar suits filed by firms in other lines of business have recently been granted in Superior Court.

#### WOULD LIMIT TRUCK LOADS

Chicago, May 28—An ordinance limiting motor truck loads on the Chicago streets to a maximum of five tons is to be introduced into the City Council at its next meeting. The recommendation for such an ordinance cites the fact that Chicago streets have been called upon to carry an unusually heavy burden in the last winter and that in many cases trucks have been grossly overloaded.

It is expected the passage of the ordinance will be passed by the Motor Truck Owners' association. The truck owners' association recently caused the defeat of the truck fender ordinance here and is regarded as one of the best protecting organizations in the country.

#### HIRE CUSTOMERS FOR DRIVEAWAY

Worcester, Mass., June 1—A number of Worcester people who own automobiles have arranged with a dealer who sells cars like those they drive to make trips to the factories in the West and drive some of the new cars back to Worcester, getting both wages and their expenses, while they are having a fine vacation. Some of them have relatives somewhere on the journey whom they can visit for a while. Women as well as men are taking advantage of this opportunity.

#### PLANS OUT FOR GYPSY TOUR

Boston, May 28—Plans for the annual gypsy tour of the motorcyclists were given out at a meeting of the motorcycle riders and dealers of Boston and vicinity held at the Hotel Oxford. The run will be held on June 20 and 21. As in former years the riders will go to Weirs, N. H.

The run this year will start from

Commonwealth Ave. and Beacon St. At Concord, N. H., a stop will be made for luncheon, served free to all on the tour. The riders will arrive at The Weirs about 4 o'clock and at 6 o'clock will go for a sail around Lake Winnepesaukee.

After the boat ride a banquet will be served at the hotel. Moving pictures of interest to motorcycle riders will probably be part of the entertainment for Sunday evening. On Monday there will be a hill climb near the hotel. On Monday afternoon the riders will start for home. Jes Campbell, president of the Massachusetts Motorcycle association, has been appointed tourmaster.

#### PREPARE FOR UNIONTOWN RACE

Uniontown, Pa., May 28—Extensive improvements are being made at the Uniontown Speedway in preparation for the 225 mile fourth annual grand opening event on Saturday afternoon, June 19. Purses aggregating \$25,000 will be distributed to the winners in the event, the longest ever staged at Uniontown. It is expected that the majority of the drivers entered at Indianapolis will come to Uniontown for the opener here. The race is also a Universal trophy cup event.

#### HAS NEW GASOLINE PROCESS

Fall River, Mass., June 2—A plant is being built here for a new process whereby the output of gasoline from a given quantity of crude oil may be increased. And this is not all. The new process also eliminates waste and produces a better grade fuel oil. Incidentally the navy department has contracted to take this fuel oil at a saving to the government of \$1,500,000 a year.

This new refinery, being built from funds supplied by the government, brings another industry to Massachusetts.

The contract for the first 3,000,000 barrels of the new oil has been awarded by the navy department to Cochran, Harper & Co., of 60 State street, Boston. The fuel oil is one year's supply for Uncle Sam's oil-burning battleships.

According to R. M. H. Harper of the Boston company the development in the oil industry results from the discovery of a new "cracking" process.

#### BOSTON DEALERS MEET

Boston, June 2—About 100 members of the Motor Club last night attended a monthly meeting in Bates Hall, Y. M. C. A. Building.

Chester I. Campbell, secretary of the Boston Automobile Dealers' Retail association, spoke on co-operation between employers and employees, placing emphasis on the value of efficient service. Pres. G. M. MacFarlane of Auburndale also spoke. Harry Holtz of Everett, presided. Twenty-five were admitted to the club.

The committee in charge of the meeting included, besides Harry Holtz, J. M. Roberts of Everett and S. J. Verdi of Somerville.

## "Ship-by-Truck" Tour Teaches New Orleans Dealers Need of Good Roads

NEW ORLEANS, May 29—Truck dealers of New Orleans are using the recent truck tour in which they battled with mud for thirty hours to make the run to Baton Rouge, which should have been made in ten or twelve hours, as the basis of an appeal to the state legislature of Louisiana to take immediate steps to improve the entire system of mud trails which pass for roads in this state, especially in the southern part.

A bill drawn by President Milner of the Louisiana Motor League, authorizing a bond issue of approximately \$35,000,000 for a statewide highway system, is about to go before the legislature, with the support of Governor John M. Parker, more than half of each of the two houses of the legislature, the Louisiana-Mississippi Automotive Trades association, the Louisiana Motor League, the Louisiana Auto Club, and the city government of New Orleans, not to mention every motorist in New Orleans. The dealers have now come in with page advertising in all the newspapers, with circular letters to all the legislators and with a general campaign of publicity for better roads.

The only opposition so far met by the proposition to issue these bonds comes from the state highway department, of which Duncan Buie is chief and which would be eliminated by the Milner bill. This bill, in brief, provides for the issue of \$35,000,000 in bonds by the state, to be paid in 40 years from the product of a one-mill tax and an increase in taxes on all automotive vehicles. Part of the funds so received is to go for the upkeep of the roads, the principal of the bonds to be devoted entirely to construction, and the balance of the tax-income to paying off the bonds. After the bonds are paid off, the tax-income is to go entirely to road maintenance. The state highway department would be completely reorganized, put under the sole authority of a commissioner of highways, responsible directly to the governor and the legislature; the parishes would have nothing to do with road construction other than furnishing the rights of way where possible, and no funds would be taken from the parish treasuries.

Jobs in the state highway department always have been political plums, and, naturally, the holders of these jobs are opposing general state control of the roads leading to the complete reorganization of their department, and the elimination of many of these job-holders. The truck dealers of New Orleans and other cities of Louisiana have become thoroughly aroused, however, and have started in on a campaign to obtain a statewide system of permanent roads which will connect with national highways at the borders of the states.

Efforts of these dealers to observe Ship-By-Truck Goods Roads Week in

New Orleans created considerable impression in Baton Rouge, the state capital, where they arrived on the evening of the day on which Mr. Parker was inaugurated governor. C. A. King, who accompanied the ship-by-truck paraders to Baton Rouge received a telegram from Ernest Farr, chief of the Firestone Ship-By-Truck Bureau, expressing the gratitude of the Firestone people for the hearty co-operation given by the New Orleans dealers in the organization and conduct of their observance of Ship-By-Truck Good Roads Week here.

### MEMPHIS TO GET WAR TRUCKS

Memphis, Tenn., May 28—The War Department convoy over 3690 miles motor convoy trip will bring the trucks to Memphis July 14. Then to Arkansas, Forrest City July 16, Brinkley, July 17. The trucks will not move on Sunday. J. A. Rountree, secretary Bankhead Highway, Birmingham, is keeping a line on the convoy which goes to the far Southwest territories.

### TWENTY IN SYRACUSE RUN

Syracuse, May 29—Twenty motor trucks representing sixteen dealer establishments concluded to-day a tour which covered 350 miles in six central New York counties, the tour arranged in recognition of Ship-by-Truck-Good Roads week and marking the first co-operative effort of Syracuse truck dealers was a demonstration to the farming territory of the performing ability of pneumatic tired trucks. It was in no sense a parade. There was propaganda, of course, at noonday and evening.

Meetings attended in the aggregate

by more than ten thousand persons in twenty towns, but an outstanding feature of the undertaking was the actual demonstration work done by the trucks which handled milk, grain, hay, highway materials and other loads for farmers along the route, and in one place brought cord wood out of a field until then classed as impassable for trucks. The tour was the first ever held in this territory and several of the towns visited declared a half holiday of business and schools while in others grange meetings welcomed the party.

### SEES LIMIT ON GAS SALES

Cincinnati, O., May 28—A prediction that the production of gasoline at the end of the present year would be sufficient only to allow two gallons a day to each automobile in the United States was made by C. F. Kettering, Dayton, O., President of the Dayton Engineering Laboratories Co., before the Cincinnati Engineers' Club.

The shortage, in Mr. Kettering's opinion, will have a good effect, inasmuch as it will compel engineers and chemists to work for the production of a new fuel to take the place of gasoline.

"This problem will be solved as all problems have been solved in the past, and as the greatest problems of all time, the submarine problem, was solved," he said. "The future for the engineer holds great possibilities in sight."

### NO NEW ORLEANS GAS SHORTAGE

New Orleans, May 28—New Orleans and this section of the South probably will not feel the gasoline shortage forecast for this summer, according to C. O. Scholder, vice-president of the Standard Oil Co. of Louisiana. The probability of such shortage all over the country was expressed a few days ago by A. C. Bedford, chairman of the board of directors of the Standard Oil Co. of New Jersey.

## Highway Council Watching Moves of Railroads to Hold Up Road Work

NEW YORK, May 28—The Association of Railway Executives has under consideration a proposal to the Interstate Commerce Commission and the public utilities commissions of the various states that construction work on highways be kept down to a minimum so that additional labor and materials may be released for use of the carriers. This is in line with the contention that steel should be diverted from the manufacture of automobiles to the making of freight cars and other equipment.

The Eastern carriers assert that there is a widespread use of coal cars for transportation of road building materials. While the Interstate Commerce Commission would have no jurisdiction over road building, it could cut off shipments of materials by priority orders if it were so inclined. There is no intima-

tion as to what stand it will take. It has not been made clear in what way the government could help the railroads get labor if work in other lines were stopped. The carriers have contended that many of the switchmen who have quit have gone into automobile factories or with highway contractors.

The Federal Highway Council is watching the situation and will oppose as far as possible the placing of road-building material and equipment in the non-essential class, because it believes that with the main line of transportation broken down it is extremely important that work should continue on such roads as serve important traffic centers. The highways are called upon daily to handle increased traffic burdens. Their improvement has been neglected for almost three years and further neglect



would deprive the public of their use in the present emergency when they are most needed.

"It is absolutely necessary that motor truck transportation be organized at every possible point and as much freight as possible sent over the highways," says a statement issued by the Federal Highway Council. "The motor truck is destined to play an important part even though the congestion is promptly relieved because of the high advances which it will be necessary to make in both freight and express rates. The express companies are now asking from 10 per cent to 25 per cent increases in rates at hearings just started in New York by the Interstate Commerce Commission. The Railroad Labor Board sitting in Chicago is being asked to pass on a \$1,000,000,000 increase. Already a \$1,000,000,000 increase has been granted since the beginning of the war. The railroads are in absolute need of equipment amounting to \$1,000,000,000, all of which necessitate greatly advancing freight and express rates to such an extent that much traffic not heretofore found on the highways will be handled immediately by motor truck."

#### TOLEDO TO GET BUS LINE

Toledo, O., May 28—An ordinance providing for the establishment of a municipal bus line and appropriating \$2,000,000 for such system to supplant street railway service in the event of emergency will be introduced in council and submitted to the voters at the August 10 primary for their approval. It was planned to introduce the ordinance Wednesday, but postponement was necessitated by the failure to adopt a name for the company, which could be presented to the council. Prompt passage of the ordinance is certain, and the approval by the voters of the appropriation also is assured.

## Indianapolis Dealers See Big Results From Farm Truck Tour

INDIANAPOLIS, Ind., May 28—Indiana has had a big lesson on the motor truck and local dealers say the lesson will result in more sales and larger use of the motor truck.

The first motor truck ever conducted in Indiana ended today with a parade of the downtown streets. Headed by the Indianapolis Military Band and a police detail, the tourists started the parade from Meridian street, Delaware street and Capitol avenue. The tour was made under the auspices of the Indianapolis Automobile Trade association.

The men of the caravan pronounced it a big week, in which they covered 304 miles in 20 hours and 55 minutes of actual running time. The statisticians in the party figured that the tires covered 168,000 touring miles without a puncture and the only mechanical mishap was to

the bearing on a fan shaft of one of the trucks. The entire caravan was in the parade this morning.

The tourists said their welcomes were of a most hospitable nature everywhere. The caravan left here in a driving rain and it encountered rain on four of the six days it was out.

The crowds were surprisingly large and at almost every town delegations of motorists ran out to meet them. Demonstrations of the use of trucks on farms were made every day and there were lectures by experts on the use of trucks. The bad weather only served to prove the adaptability of trucks to all kinds of conditions and this point was the one most discussed by those who witnessed the demonstrations. Accompanying the tour was a truck carrying a Delco lighting system which provided illumination for the night meetings.

## Interstate Commerce Commission Urges Use of Trucks for Freight

WASHINGTON, May 28—Instructions issued to-day by the Interstate Commerce Commission for the creation of terminal committees to operate at important railroad terminals, gives full recognition to the motor truck as an essential utility. Other sections of the order, however, afford concern to traffic men in the automobile field because of the broad powers conferred upon these new committees. The question has arisen as to whether or not these committees with a varied personnel would force the movement of passenger cars under their own power.

Number 7 in the list of subjects for the committee on inquire into roads "to use every effort that orders for placement of cars shall conform to the actual necessities of the proposed movement, and to discourage waste and needless transportation during the present emergency." The point which gives ground for some uneasiness deals with the judgment of these committees in the interpretation as to what constitutes "needless transportation." Their recommendations might, in fact, be equivalent to a priority list, though no such schedule was officially given out by the Interstate Commerce Commission. Many traffic officials here believe the passenger cars would not fare well under preferential placement of cars.

The Commission has advised the committee to keep in close contact with the shippers at the terminals. They are urged to study the situation carefully, confer with all interested parties and adjust traffic matters whenever possible with calling upon the Commission for assistance. The committee will act in an advisory capacity to the Commis-

sion on Car Service which will have charge of the operating work.

Detroit, May 28—Denial of various rumors that General Motors was planning to close down part or all of its units for a time and that a cut in wages was contemplated, was made by General Manager George H. Hannum in charge of the Saginaw units, following a conference with President W. C. Durant in this city.

#### G. M. C. NOT TO SHUT PLANTS

"That is not a policy of General Motors," said Mr. Hannum. "General Motors does not intend to close any of its plants and it does not intend to cut wages. There is no foundation whatever for such absurd reports." Reports have been persistent about Detroit that General Motors units would be closed temporarily, and when reopened would start on a basis of a substantial reduction in wages. Mr. Hannum's statement applies to all units of the corporation.

#### REBUILD TACOMA SPEEDWAY

Tacoma, Wash., June 1—With the rebuilding of the Tacoma Speedway grandstand, the racing plant represents an expenditure of upwards of \$300,000, and is rated as one of the best equipped in the United States.

The new stand will extend for more than a third of a mile around the track and afford an excellent view of the drivers in action. A tunnel will be built from the field to the stand and a new overhead bridge from the main entrance gates to the field. The stand for the judges will be rebuilt, and the pits will be enlarged and the number increased.

The majority of the drivers entered for the big Fourth of July race meet will assemble in Tacoma by June 20 for the 225-mile classic, which will be the big event this year.

#### ST. LOUIS TOUR SPELLS MUD

St. Louis, May 31—The Ship-by-Truck tour of the Commercial Car Bureau of the St. Louis Automobile Manufacturers' and Dealers' association, which left here on May 17 for a trip through Missouri and Illinois, was due to end here on May 22. The expedition got back to town on the afternoon of May 26.

The name of the expedition truly was mud. Bad roads throughout Missouri and Illinois was the cause of the delay. The trucks frequently were mired in the mud, but they kept pluckily on, completing its 400 mile tour.

It was felt that the trip will result in a splendid object lesson of the need of good roads, and will be a forceful argument in favor of the \$60,000,000 road-bond issue to be voted on in Missouri in November. For this reason alone the dealers feel that the trip was worth while.

## Atlanta Federal Reserve Bank Shuts Off Credits

### No Further Financing of Passenger Automobile Purchases, De- crees Governor

ATLANTA, Ga., May 28—Credit of the Federal Reserve Bank, or of its affiliated banks, will not be used to finance the purchase of passenger automobiles, according to M. B. Wellborn, governor of the Federal Reserve Bank here, and head of this district, which embraces most of the large cities of the Gulf Coast region of the South.

Mr. Wellborn first made this statement in New Orleans a few days ago, at a luncheon given to him and to other members of the Federal Reserve Bank Board of Directors by the Association of Commerce in the Crescent City. The National Automobile Chamber of Commerce at Washington telegraphed Mr. Wellborn asking for confirmation or denial of the statements attributed to him at New Orleans. Here is his reply to the national chamber:

"In view of the present strain on the banking credits in this district, it is imperative that we should have an intelligent and discriminating policy of control. We have reached a point where we must consider affairs from the viewpoint of the general economic interest, and to think primarily in fundamental terms of production of the necessary things of life, and not simply in the narrower terms of enlarged business and increased profits.

"The automobile business has grown to large proportions and consumes credit and labor in a correspondingly large degree, and, while I am in favor of granting credits for trucks and tractors and cars used strictly for business purposes, I do not believe that the present is the time when the credit structure should be called on to bear the burden of financing automobiles that are used for pleasure purposes. In these times it is necessary to control credit and, unless we take a firm stand, the more necessary demands of production and distribution will be jeopardized, by tying up our funds in re-discounts that tend to encourage unusual extravagance."

### SPOKANE CREDITS TO BE CUT

Spokane, Wash., May 30—Declaring that Spokane automobile dealers should play less golf and spend more time on the sales floor and urging that credit be pruned to normal conditions, that motor car sales contracts be revised and that prospective customers be selected through approved credit channels, E. E. Flood, vice-president of the Exchange National Bank, appealed to members of the Spokane Automobile Chamber of Commerce for co-operation.

Mr. Flood reviewed the trend of financial conditions, the activities of the Federal Reserve Board, the effort to liqui-

date a percentage of loans and steps being taken to solidify the foundation of business in general. He suggested that no new contracts be made until crop conditions for 1920 are positively known.

"During the four years prior to the last six months, the Exchange National Bank handled approximately \$6,000,000 in automobile paper with a loss of but \$43 on a protested check—practically a 100 per cent record," said Mr. Flood. "This fact is a demonstration of the worth of such security. The present stringency is national, but has not yet affected the west in the same manner as the east. We must conserve along all lines, take care of the folks at home, hold credit down to brass tacks and then there is little doubt that our individual business will prosper. The banks are interested in assisting the Spokane automobile industry in getting the automobiles off the cars. After that the purchaser has a right that must be recognized."

### CURTAILED CREDITS HELP USED CARS

New Orleans, La., May 28—The statement by M. B. Wellborn, head of this district of the Federal Reserve Bank, with headquarters in Atlanta, that no more money would be advanced for loans on passenger cars, has inspired the used-car dealers of this section with the idea that the second-hand car is going to be in greater demand this summer than ever before. They are talking about a used-car show in June, and already are doing more extensive advertising than they ever have done before.

### CREDITS UP TO INDIVIDUAL BANKS

New York, May 28—W. P. G. Harding, governor of the Federal Reserve Board, has sent to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, a letter outlining his views on the stand which should be taken by individual Reserve banks relative to automobile paper. It was contended by the chamber that serious injury was being done by the industry by bald assertions made by officers of Federal Reserve banks, especially at Kansas City and Atlanta, that passenger cars were "luxuries."

In his reply, Mr. Harding took the position it was not for the Reserve banks to determine what are and what are not essential industries. He holds that the general policy of the board in relation to the deflation of credit has been outlined to the member banks and that they have pledged their support. For this reason he feels the responsibility of deciding what paper should be discounted should rest on these members rather than on the district Reserve banks. Mr. Harding feels the bankers individually are in a better position to determine to whom credit should be extended. He makes the point that there can be no hard and fast rule in this respect. While automobile paper may be as good as wheat in one district or city it may not be in another.

## Manufacturers Accede to Deflation Campaign Plans

### Production Now Is Only About 65 Per Cent of Year's Schedule, Says N. A. C. C.

NEW YORK, May 28—Passenger automobile manufacturers have accepted gracefully the inevitable inconveniences caused by the process of deflation through which the country now is passing. They realize, according to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, that production must be curbed to a certain extent because of the credit situation. On top of this has come the railroad collapse which has made mandatory a curtailment greater than otherwise would have been necessary. They will exert every resource to keep factories going up to the limits possible under conditions which now prevail.

Production is now at the rate of 65 per cent of the manufacturing schedules, Mr. Reeves said, and every effort will be made to keep it up to that figure. There is a disposition on the part of manufacturers to feel that they were buying a bit too heavily. This resulted in a rather arbitrary attitude on the part of some of the companies of which they were customers. A buyers' market is now being restored, although some of the plants are short of engines, glass, etc.

Reports received by manufacturers show that there has been some slowing down in the business of dealers. They took their spring orders in January and February and are making deliveries now of cars ordered then. Business coming in at present is about on the scale which might be expected in June and July. Some bankers are disposed to curb credit to dealers but those who are well established are having little trouble in getting funds for legitimate needs.

The message of the N. A. C. C. to dealers is to sit tight and not get panic stricken. The demand for cars is strong and there is every reason to believe it will continue strong. They will have no trouble in finding a market for all the cars they can get. Where credit restrictions are most stringent now they will be likely to loosen up when the rail jam is relieved and there is no intention on the part of government authorities to discriminate unjustly against the passenger car industry.

### NEW ACCESSORY FIRM IS FORMED

Chicago, May 29—The Cloud Accessories Corp. was organized here, this week, to handle Morgan cord fan belts, Silverlining for Ford transmissions and Cloud spark plugs, all of which are now in production and will soon be on the market. The new corporation is headed by Kenneth Cloud who has had long experience with various automobile accessory and supply organizations.



## New Hampshire College Has "Mechanical Farming" Course

### Agricultural School Has Big Classes of Students in Operating and Repairing Tractors

DURHAM, N. H., May 28—Motor tractor firms throughout New England were represented by extensive working exhibits at an intensive course in mechanical farming held here last week at the New Hampshire State Agricultural College. More than 100 students, including several women, were for several days engaged in studying the practical workings of many makes of tractors and tractorettes, which "do everything a horse can do, and more."

Not only the owners of large farms, where crops covering many acres are grown, but gardeners were also present at the lectures and demonstrations.

The course included three days of practical mechanical agriculture, from May 18 to 20. The enterprise was the first of its kind to be conducted in New England and the tractors included all of the principal makes. Experts were on hand from all the companies to explain the workings and fine points of each machine.

Many offers have been received at the college from big farmers of New England for school graduates to operate tractors during the summer months. Thirty-five dollars a week, with board, is being commonly offered. The demand for graduates is great.

### WARNS DEALERS ON CREDITS

South Bend, Ind., May 29—Cognizance of the growing seriousness of the motor car credit situation is taken in a letter which has been addressed by the Studebaker Corp. to all its dealers and distributors. The Studebaker company notifies its dealers that they may find it increasingly difficult to get credit but advises dealers who are dealing with banks which may refuse them reasonable credit accommodations to take their business elsewhere.

The Studebaker Corp. believes the statement of the Federal Reserve Board that the automobile industry is not being discriminated against, telling its dealers that credits are being curtailed for all businesses in which the banks believe their customers are abusing their credit.

### CINCINNATI TO HOLD TOUR

Cincinnati, O., May 28—A truck farm and demonstration tour will be started by the Cincinnati Truck Dealers' association June 21. The demonstration is to be not merely a parade of trucks but will be an honest-to-goodness demonstration of what motor trucks can do for the farmer. No sales will be attempted during the trip, each dealer having agreed to forfeit a tidy sum if any sales talks were made before the end of the trip.

Prospect cards will be handed out and the prospects gone after at the close of the tour. The trip will cover Southern

Indiana, Southern Ohio and Northern Kentucky. Only the nineteen members of the Truck Dealers' association will be permitted to participate and it is expected that twenty to thirty trucks of different makes will be in line.

The tour will be made on a strict schedule, with experts in charge of routing, publicity, advertising, appointment of farmer committees, etc., and will take in a territory of a radius of 75 to 100 miles of Cincinnati.

### ALLEN PRODUCTION CONTINUES

Columbus, Ohio, June 1—Production of passenger cars will be continued by the Allen Motor Co. despite the fact that a receiver for the concern has been appointed. It is expected that the financial affairs of the company, which brought the necessity for a receiver can be adjusted within a short time.

A receiver was appointed at the request of the Connecticut Telephone & Electric Co. of Meriden, Conn., which alleged due and unpaid claims of \$7,042 for materials. George A. Archer and W. A. Willard, both of Columbus, were named receivers. The Allen company admitted the truth of the claim and consented to the appointment of the receivers.

### URGE MORE TRUCK SHIPMENTS

Fort Wayne, Ind., June 2—The value of truck hauling in getting goods to customers in nearby cities in the shortest possible time has been emphasized by the Wholesalers' and Jobbers' Bureau of the local Chamber of Commerce in a unique booklet just issued for distribution on four "Get-Acquainted" tours staged by representatives of local jobbers, wholesalers, manufacturers and banks—these tours taking the representatives to all the nearby cities.

In this booklet is a map showing all the interurban and steam roads leading out of Fort Wayne and, in addition, particular stress is placed on the fine auto roads which radiate from this city in all directions. The booklet states that if the merchants in the nearby towns will purchase supplies from local firms they will get their goods quicker than if they purchased from other cities.

### SEES NO TIRE PRICE RAISE

New York, May 28—A survey of many of the smaller tire companies discloses no tendency on their part to increase prices again. On the contrary it would not be surprising if there were a reduction in the Fall. All the smaller tire plants are operating profitably although they are suffering, like other manufacturers, from transportation difficulties. Long staple cotton for tires is scarce but they have been able to obtain supplies sufficient to keep going.

Both the large and small tire makers are depending more and more on motor trucks for transportation of raw materials to the plants and distribution of the finished product. Most of them are sending their tires away in trucks but little attempt is being made to give deliveries by this means outside a radius of 150 miles.

## Bloomington Dealers Join In New Illinois Association

### Hope to Increase Membership by Drawing on Smaller Towns in the Neighborhood.

BLOOMINGTON, Ill., May 28—The Bloomington Automobile and Tractor Association voted unanimously to join the recently organized state association and agreed to co-operate in every way possible. F. C. Zillman, the secretary-treasurer of the state body, delivered an address, outlining the plans for the future and pointing out the advantages of membership. The Bloomington association has a paid in membership of thirty-six, all of whom are in business in Bloomington. Mr. Zillman planned to call upon all of the dealers in the smaller towns of the county and hoped to secure at least twenty-five more. Should he become successful, it is expected that the Bloomington association will extend its territory and admit members from every point in the county.

The Bloomington dealers, realizing the need for action in improving the roads, voted to appropriate \$1,000 for this purpose and the money will be utilized in distributing oil. Efforts will be made to secure similar action from other groups of business men. The approximate cost of oiling a road is \$600 per annum. The Bloomington dealers are hopeful that their action will be an incentive to other bodies and that at least \$10,000 can be raised for this purpose.

### GIVES MOTOR FARM COURSE

Baton Rouge, La., May 29—The bill creating the new agricultural college to become a part of Louisiana State University, provides that one of the departments of the educational institution is to be devoted to instruction in the benefits and uses of automotive vehicles on the farm. The course in this form of engineering is to include training with tractors and trucks and other motor farm implements; electric lighting plants, refrigeration plants, portable motor sawmills, and similar modern equipment for facilitating agricultural work. Incidental to the study of trucks and their uses, will be considerable instruction on the building and maintenance of good roads, and comparison of truck shipment methods, economy and results as compared with shipment by horse-drawn vehicles, trains, and waterways.

With the training on the use of tractors will come specialized instruction in plowing and cultivation, depth of plowing for various crops, handling of tractors in rice and sugar fields, etc. Clearing of land by motor-driven portable sawmills, stump-removers and similar machinery also will come in as a part of the course. General driving and upkeep of automobiles and internal combustion engines also will be taught, with a period devoted to the use of the passenger car on the farm.

# Standard Mechanical Operations in Tractor Service

by John Charles Thorpe, M.E.  
and Gustav Howard Radebaugh



**EDITOR'S NOTE:** The two pages herewith are the seventeenth of a series covering the service operations on tractors, although the same can be applied quite generally to passenger car and truck engines. In the last article in *MOTOR AGE* we told in part the operations necessary to repair or replace a faulty pump impeller. This installment is a continuation of these operations. The views should be studied closely, and the tools used as shown. The operations are depicted in the approved manner and should be followed to secure the best results.

## PART XVII—THE COOLING SYSTEM

### Locating and Repairing or Replacing Pump Impeller

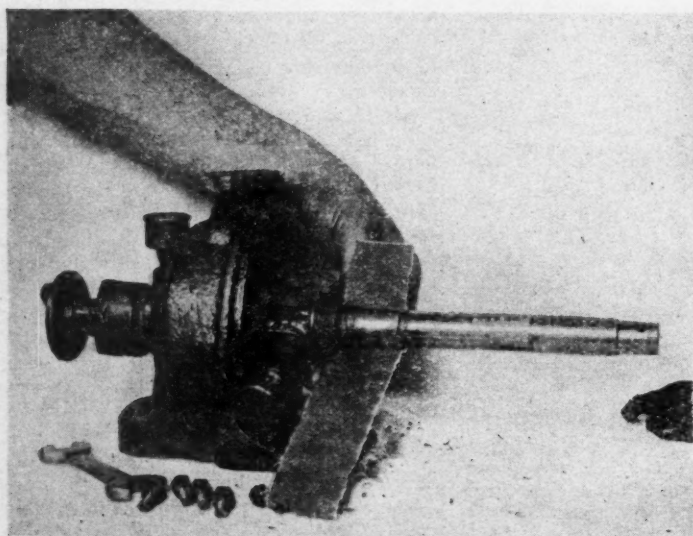
(Continued from last week.)

The water circulation is maintained by a centrifugal pump, driven from a gear on the camshaft, by direct connection on an auxiliary shaft driven from a special gear assembled with the engine gears, or by direct installation on an extension of the crankshaft. In some instances, the pump is installed on what is known as the half-time shaft, whose principal duty is to drive the magneto.

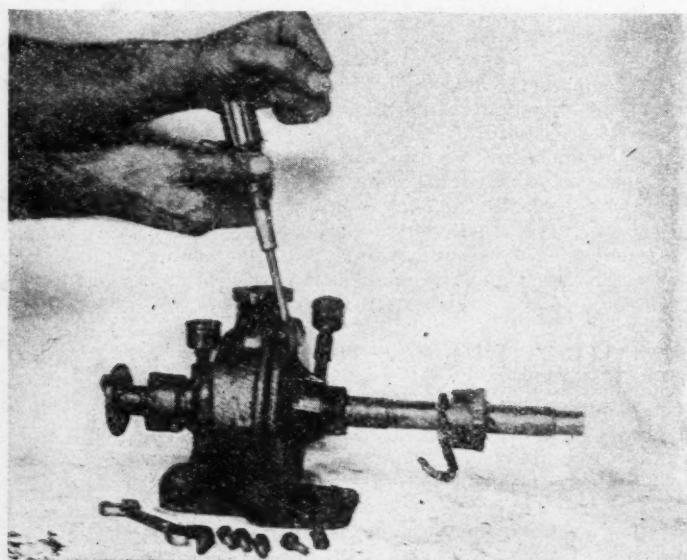
The pump, which is of the centrifugal type, draws the water through a proper connection from the bottom of the radiator and forces it through the water passages of the engine and

out into the top radiator section. Under the pump pressure it passes through the radiator tubes or honeycombs, where a great deal of heat is dispelled into the current of cold air passing over the radiating surface under the induced draft of the fan. It passes to the base section and is ready for a repetition of its cycle.

It will be seen that there is a lot of work for the pump to do. Occasionally, due to foreign matter getting into the pump, freezing or faulty material or workmanship, the key or pin, fastening the pump impeller to its shaft, breaks or shears. The repair involves an interesting service operation.



11. During the operation of the engine it is frequently the case that rust and scale is collected by the packing about the pump shaft. This will adhere to the shaft, giving it a rough surface that is hard to keep packed. Remove scale from shaft with fine emery cloth



12. Remove machine screws holding flange on pump housing and separate it from pump housing by inserting screw driver. View shows packing nut and packing removed from its place on the shaft





13. Remove flange from pump housing and shaft. View shows gasket in making water-tight joint between flange and housing



14. It may now be seen that the key on the shaft is sheared, as the pump may be turned on the shaft without effort

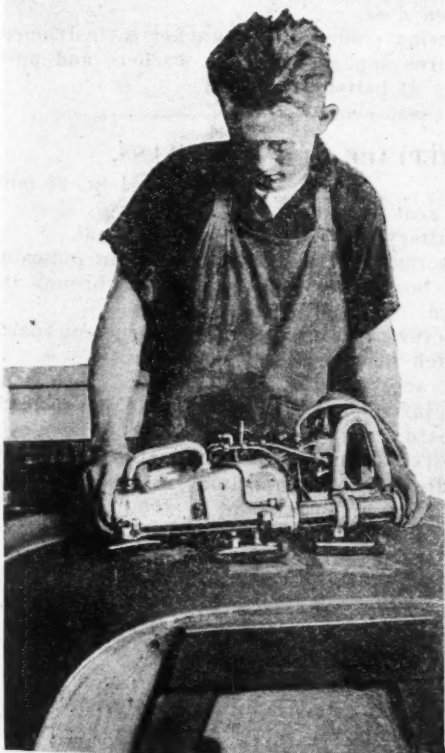
## BROWN RUBBING MACHINE

### Designed to Supplant Hand Rubbing in Paint Shops

**T**HE Brown rubbing machine shown herewith is the invention of Spencer Brown of the H. H. Franklin Mfg. Co., builders of the Franklin car. The machine is designed to supplant hand rubbing in paint shops. For over a year a number of these machines have been

used in regular production operations in the Franklin paint shops, and operators have been able to rub out seven bodies daily, which is double the amount of work turned out by hand rubbers in the same length of time. The machine has two feet, or kickers, working in opposite directions at each stroke, and uses compressed air as a propellant. The

construction of the feet makes it possible to rub on uneven or rounded surfaces as well as on flat surfaces. The frame and all possible parts are made of aluminum, and the total weight is about twenty pounds. Oil under sixty pounds pressure lubricates the cylinders, while the other parts are supplied by ball oilers. When the power is shut off, no oil circulates, and there is no excessive oil to drop on the surface and impair the work. The machine can be used on vertical surfaces as well as horizontal, and it rubs with the same materials used in hand rubbing.

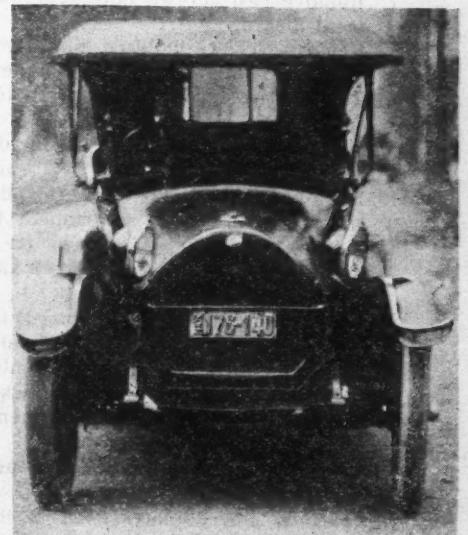


With the Brown rubbing machine it has been found possible to double the work turned out by hand rubbing

## Device for Moving Headlights in Any Direction

**A** NEW device for headlight control invented by Karl A. Kendrick of Detroit is ready to be placed on the market. The mechanism is such that the headlights may be turned in any desired position, from facing the rear to straight up, or any angle between, and lock at any point desired. The operating means consist of a small handle of any simple design, placed at any convenient place, preferably on the cowl dash of an automobile. From this means they may be turned to any position from a single point of operation. The construction is such that any number of lights may be used as a unit, and the entire mechanism is of such construction that it may be applied to any make of car, and sold at a very nominal price, within the reach of all. By turning the lights a little to the right, when passing other cars, blinding of glaring headlights is eliminated, without dimming. Tires and engine trouble may be easily fixed by this method, as the lights may be turned to any point on the car. Spotlights may be entirely done away with, as the headlights can do anything for which a spotlight is used. An adjusting means is provided so each

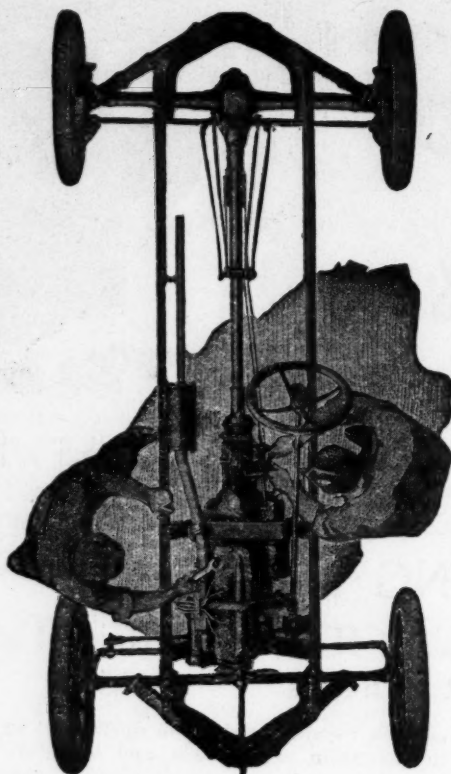
light may be set in any desired position on either the horizontal or vertical axis, and both lights operated as a unit.



With this headlight control the lights may be turned to any position; from facing the rear to straight up

# SERVICING THE OVERLAND FOUR

*THIS is the sixteenth of a series of articles dealing with the service operations on the Overland Four. The work as it stands has been prepared by the Willys-Overland Co. and the dealer will find at the head of each operation the amount of time required to do the job. The operations have been put down in a step-by-step method so that one operation is logically followed by the next. This makes it possible for the service man to have on hand all the necessary tools and equipment before beginning the job. Incidentally, the time limit set for the job affords a ready means whereby the skill of the mechanic can be judged. Other things being equal it should not take a man longer to do a certain job than herewith mentioned, as the service department of the factory has established these limits after much experimenting. Dealers who are not keeping copies of MOTOR AGE on file are suggested to do so to get the benefits of this series.*



## Part XVI

*THESE valuable articles—Servicing the Overland Four—will run serially each week until the service operations on the entire car have been explained. This week deals with the*

### Gasoline, Tank, Instrument Board, Etc.

*Keep a file of MOTOR AGE for ready reference. The flat-rate system of estimating on a job has been proved the best plan to make your service work more profitable, eliminate complaints and please your customers. The time given here for each service operation can be adapted to the flat-rate system of estimating cost of repair jobs on cars of this class.*

#### TO REMOVE AND REPLACE INSTRUMENT BOARD.

Time: 3 hrs.

1. Remove front seat cushion.
2. Disconnect cables at battery terminal.
3. Remove three cap screws, lock washers and nuts from steering column dash bracket and pull bracket up.
4. Remove two screws and nuts holding current indicator to instrument board and push instrument through instrument board.
5. Remove two screws holding switch to instrument board, and push switch through instrument board.
6. Remove two screws and nuts holding instrument board lamp to instrument board and push lamp through instrument board.
7. Remove two screws holding ignition switch to instrument board.
8. Remove screws holding speedometer head to instrument board and remove speedometer head.
9. Remove two screws with nuts holding instrument board light to instrument board.
10. Disconnect control wires from distributor and carbureter.
11. Remove two cap screws, nuts and lock washers holding control assembly to instrument board and pull out.
12. Remove four machine screws (two on each side) holding instrument board to cowl and remove instrument board.
13. Install new instrument board to position with four machine screws (two on each side).
14. Assemble throttle control assembly to new instrument board with two cap screws, lock washers and nuts.
15. Assemble dash light to instrument board with two cap screws and nuts.
16. Assemble ammeter to instrument board with two cap screws and nuts.
17. Assemble speedometer head to instrument board with three machine screws.
18. Assemble ignition switch to instrument board with two machine screws.
19. Assemble gasoline tank supports to gasoline tank stand-

ards with two 1/2-in. stove bolts, plain washers under head, lock washers and nuts.

20. Assemble lamp to instrument board with two screws and nuts.
21. Assemble switch to instrument board with two screws.
22. Assemble current indicator to instrument board with two screws and nuts.
23. Assemble steering column dash bracket to instrument board with three cap screws, lock washers and nuts.
24. Connect cables at battery terminal.
25. Replace front seat cushion.

#### TO REMOVE AND REPLACE WIRING HARNESS.

Time: 1 hr. 30 min.

1. Remove front seat cushion.
2. Disconnect battery cables at battery terminal.
3. Remove two screws and nuts holding current indicator to instrument board and push instrument through instrument board.
4. Remove two screws holding switch to instrument board, and push switch through instrument board.
5. Remove two screws and nuts holding instrument board lamp to instrument board and push lamp through instrument board.
6. Disconnect wires from each instrument. If you are unfamiliar with the wire connections, tag each wire as it is removed from an instrument.
7. Remove four clips (two on each side) holding wires to instrument board bracket.
8. Disconnect wire at fuse box.
9. Remove clip on gasoline tank standard holding wires standard.
10. Disconnect wire from horn.
11. Disconnect wire from starting switch.
12. Remove clips holding tail lamp wire to frame.
13. Disconnect wire from tail lamp.
14. Disconnect wires from head lamp.
15. Unscrew accelerator button.
16. Disconnect accelerator spring from accelerator rod.
17. Disconnect speedometer cable at speedometer head.



18. Remove floor boards.
19. Lift up hood.
20. Disconnect switch to coil wire at coil.
21. Disconnect current indicator to cutout wire at indicator and cutout.
22. Remove wiring harness.
23. Install new wiring harness, stringing wires through front lamps.
24. Connect wires to instruments and replace instruments.
25. Connect current indicator to cutout wire at indicator and cutout.
26. Connect switch to coil wire at coil.
27. Connect wires to headlight.
28. String wire to tail light.
29. Clip tail light wire to frame with clips.
30. Connect starting switch wire to starting switch.
31. Connect horn wire.
32. Clip wires to gasoline tank standard with clips.
33. Connect wires at fuse box.
34. Clip wires to instrument bracket with four clips (two on each side).
35. Install floor boards.
36. Connect accelerator spring.
37. Screw on accelerator button.
38. Connect speedometer cable.

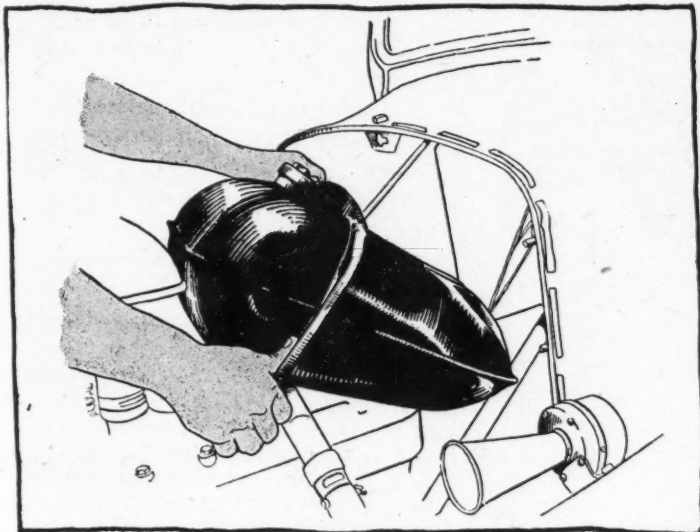


Fig. 32. Removing gasoline tank from cowl

#### TO REMOVE AND REPLACE GASOLINE TANK.

Time: 50 min.

1. Remove hood.
2. Drain gasoline tank.
3. Remove No. 4 spark plug.
4. Disconnect positive wire from battery.
5. Disconnect tank to carburetor gas line.
6. Disconnect radiator stay rod.
7. Take out the four cap screws holding gasoline standard to frame.
8. Take off the four nuts from binding studs of gasoline tank, to separate gas tank from gasoline standard.
9. Remove gas tank standard.
10. Remove gas tank from cowl, as in Fig. 32.
11. Place gas tank in position.
12. Place gasoline tank standard in position. Before assembling tank be sure that vent pipe in gas tank is open.
13. Replace four nuts to hold gas tank to cowl, as in Fig. 32.
14. Replace four holding down cap screws of gasoline standard, holding standards to frame.
15. Replace tank to carburetor gas line.
16. Replace radiator stay rod.
17. Replace No. 4 spark plug.
18. Replace positive wire of battery.
19. Fill gasoline tank.
20. Replace hood.

#### TO REMOVE AND REPLACE BODY.

Time: 2 hrs. 30 min.; 2 men.

1. If new body is to be installed disconnect top from windshield, loosen top back curtain from body, remove top bracket nuts and take top off body.
2. Remove rear seat cushion.
3. Remove upholstery from sides of rear seat.
4. Remove sixteen  $\frac{1}{8}$ -in. cap screws (eight on each side) with lock and plain washers and nuts holding rear fenders to body. Remove rear splasher.
5. Remove tonneau floor boards.
6. Remove four  $\frac{1}{4}$ -in. stove bolts, plain and lock washers and nuts (two on each side) holding body to instrument board.
7. Remove eight  $\frac{3}{8}$ -in. body-to-frame bolts with plain and lock washers and nuts.
8. Remove hood by taking out one  $\frac{1}{4}$ -in. bolt and lock washer.
9. Remove radiator stay rod assembly, by removing one  $\frac{1}{8}$ -in. nut and lock washer.
10. Lift off body.
11. If new body is installed remove windshield by removing two nuts and lock washers under cowl. Also lift out upholstery in front seat.
12. Put body on chassis.
13. Line up holes in body, side splashers and frame.
14. Insert eight  $\frac{3}{8}$ -in. body-to-frame bolts, with plain washers under head. Tighten securely with lock washers and nuts.
15. With eight  $\frac{1}{8}$ -in. cap screws attach left rear fender to body, using plain washers under cap screw heads; then lock washers and nuts and tighten securely. Replace rear splasher.
16. Connect right rear fender in the same manner.
17. Insert four  $\frac{1}{4}$ -in. stove bolts, holding body to instrument board.
18. Put on lock washers and nuts. Tighten securely.
19. Replace upholstery.
20. Put in rear seat cushion.
21. Replace radiator stay rod assembly with one  $\frac{1}{8}$ -in. lock washer and nut.
22. Replace hood with  $\frac{1}{4}$ -in. lock washer and bolt.
23. Replace floor boards.
24. On new body also fasten windshield with two lock washers and nuts under cowl. Then replace top on top brackets with bracket nuts and nut locks. Fasten rear curtain to body, attach top to windshield.

#### TO REMOVE AND REPLACE REAR FENDER.

Time: 30 min.

1. Remove rear seat cushion.
2. Pry out rear seat side upholstery pads.
3. Remove eight  $\frac{1}{8}$ -in. cap screws, nuts, and lock and plain washers holding rear fender to body and running board splasher.
4. Remove two  $\frac{1}{4}$ -in. nuts holding fender to running board.
5. Remove fender.
6. Replace fender with eight  $\frac{1}{8}$ -in. cap screws, flat washers under head.
7. Fasten fender to running board with two  $\frac{1}{4}$ -in. lock washers and nuts, and to splasher with three  $\frac{1}{4}$ -in. stove bolts.
8. Put on side upholstery pad.
9. Replace rear seat cushion.

#### TO REMOVE AND REPLACE IGNITION SWITCH.

Time: 20 min.

1. Remove two screws, lock washers and nuts holding switch to instrument board.
2. Push switch out of instrument board.
3. Disconnect wires at switch.
4. Connect wires to new switch.
5. Place new switch in position on instrument board.
6. Screw to instrument board with two screws, lock washers and nuts.

# Garage Planning

## Service Station Arrangements

No. 228

### A TWO-STORY SERVICE STATION WITH MAIN FLOOR STORAGE

I am sending you a pencil sketch of a garage I am planning to build in the near future. The second floor will be used for workshop, painting and top work, perhaps some storage, two elevators, passenger and freight. I expect to build this of steel and fireproof glass or re-inforced concrete fireproof and plate glass.

I will be pleased for you to plan this building, if description is sufficient, at your earliest convenience, if not, will gladly furnish further information. Could you give me any information regarding material or prices on same? Would like for you to furnish me pencil sketch of this

CONDUCTED BY TOM WILDER

so that I may have chance to approve before you make blueprint of same.

Thanking you in advance for this information, which I assure you will be of great value to me, I remain, Allison Motor Co., Live Oak, Fla.

We cannot send you the pencil layout of this plan for several reasons; it complicates our operations too much. The chance of its loss or failure to return would be great enough to warrant making a copy and this would be a heavy added expense. As it stands we only cash in on the department to the extent that the plans are interesting and of benefit to our 45,000 other readers. Also

MOTOR AGE is receiving many inquiries for garage plans which do not give sufficient information to permit an intelligent reply. There are certain things which should be known to lay out the proper plan for a garage, and readers are urged in asking for such plans to be used to include the following information:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

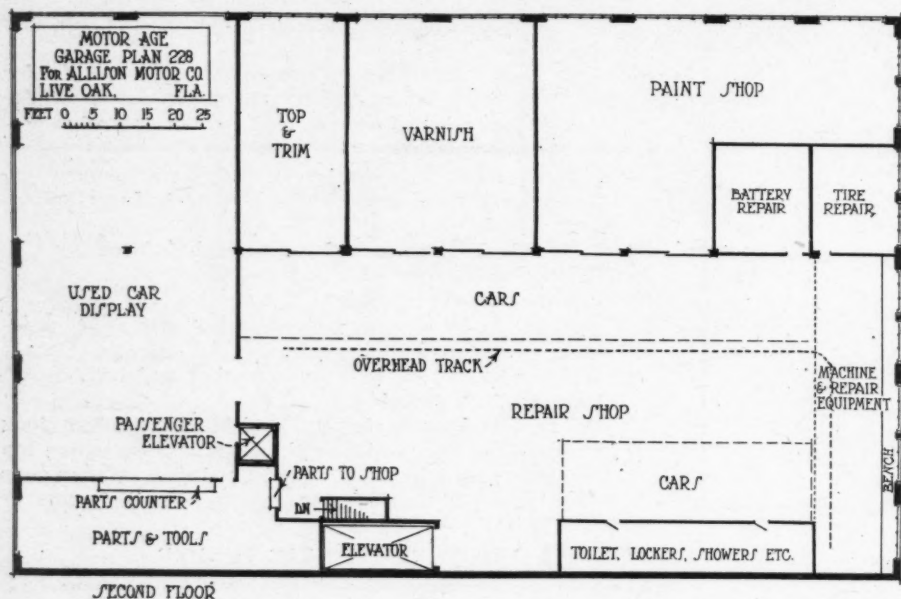
What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

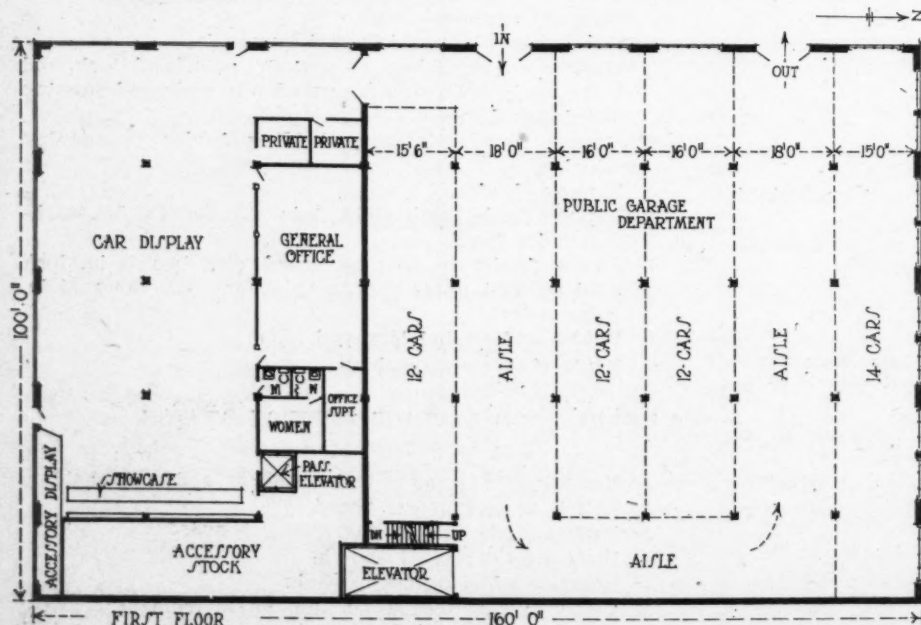
Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.



SECOND FLOOR



FIRST FLOOR

No. 228. Two-story service station with main floor storage

we have said many times before our plans are not complete working drawings but layouts designed primarily with garage management and system in view, and at the same time keeping architectural principles and practical construction in mind.

Our drawings and suggestions are to be used as guides to the local architect or builder who must work out the details of construction. It would be best to confine all the public storage to the ground floor, then your second floor is free from the intrusion of outsiders.

The used car display and parts department are easily accessible by the passenger elevator, but there is no excuse for patrons of these departments to go elsewhere.

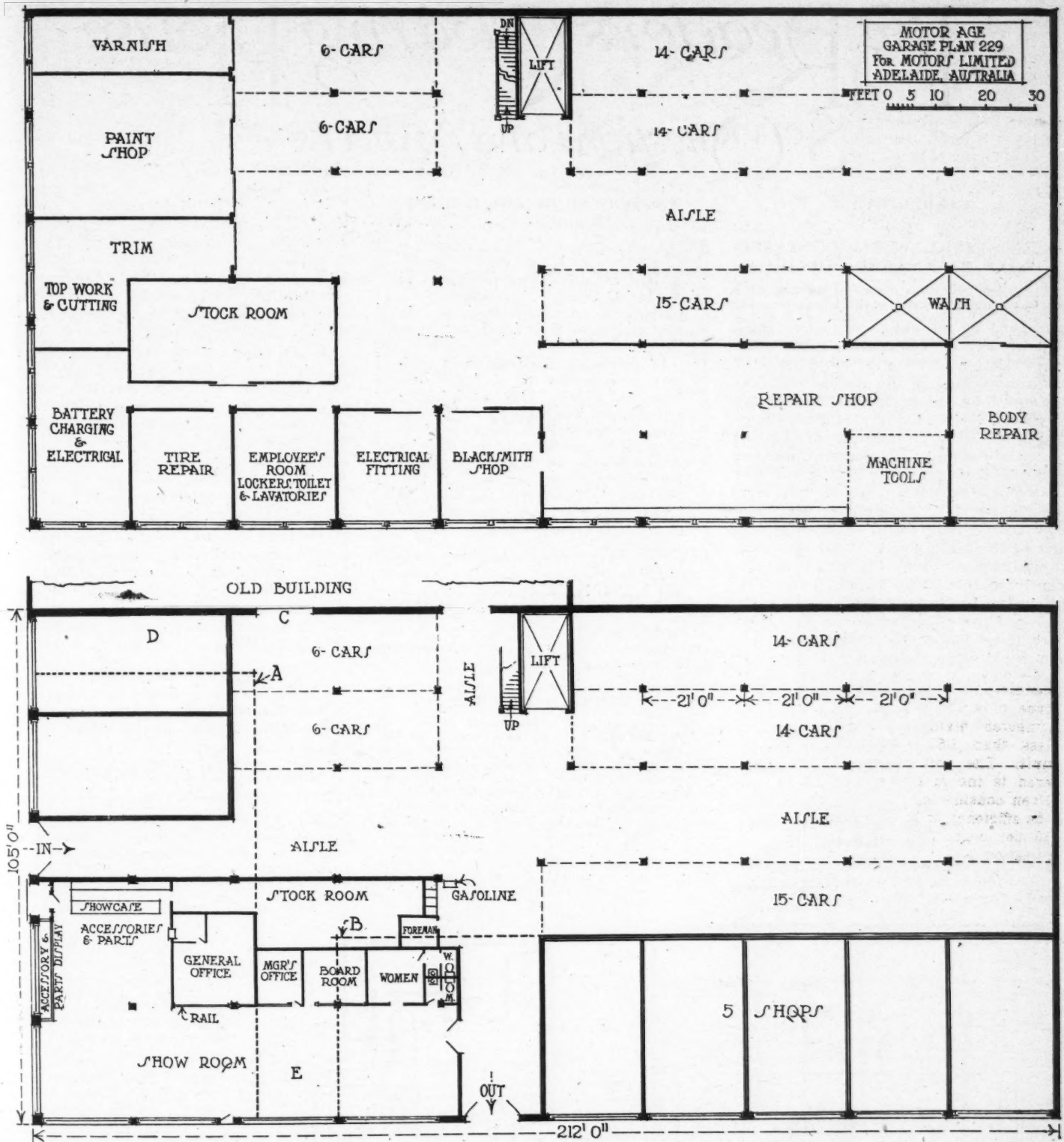
In this case, in and out doors are better than one entrance to the garage since there are two aisles and a clear passage way around. The center row of posts is made heavier than the rest to extend up through the second floor and support the roof trusses. Windows to all the showroom sections should be plate glass but those in the shop and garage might be of the metal sash variety either with clear or clouded glass.

No. 229

### ADDING TO PRESENT BUILDING

We are sole agents for two makes of American and two makes of English cars in South Australia which has a population of 450,000 and our garage is in a principal street in the capital city





No. 229. New building to be used in conjunction with present garage

Adelaide, which has a population of 200,000.

We intend to use the present garage in conjunction with the new garage for the term of the lease, but to move at once the general offices, storeroom, repair shop, forge and wash downs, into the new premises, and use the present garage as an unpacking department for new cars, storage for customers' cars and second-hand cars, connected with fireproof doors so that in time we can be intact in the new garage, and take over the shop frontages if necessary.

The first floor would have all the space above the shops available and would gain the advantages of natural light from windows.

Our greatest difficulty in the present garage has been only having an entrance which has to be used as an exit also, and it is essential in the new garage that we have an entrance and an exit to avoid unnecessary work in moving cars in the garage.

Any suggestions for the repair shop which would facilitate efficiency would be gladly welcomed.—Motors, Ltd., Adelaide, So. Australia.

Your building has been unusually difficult to arrange, and while it is hardly satisfactory in its present shape, we have had to depart from your scheme in regard to the shops, and have allowed

for only seven instead of nine. One reason for this is that should you give up all your frontage, and cut down your show room to such small proportions you would get a sort of "back alley" reputation. If it is not possible to reserve at least as much frontage as we have shown, we would be in favor of taking a less expensive plot, or giving up the storage end of your business and concentrating on sales and service. In this latter case, a narrow frontage with several floors could be used to advantage.

# The Readers' Clearing House

## Questions and Answers

### CANDLEPOWER

**Q** EXPLAIN the relation of candlepower to wattage.

**2**—What watt bulb will produce a 32 c.p. light?—Earl Shippy, Oran, Iowa.

**1**—There is no exact relation between the candlepower of a bulb and the watts consumed by the bulb. We might state that by way of comparison, there is no exact relation between the horsepower of a steam engine and the amount of steam consumed by the engine. If the engine is poorly designed, the steam consumption will be large for the amount of power produced. Another instance would be that of a fairly efficient turbine generator installation which will consume about 1.95 lbs. of coal per hour. Now an old time steam engine installation of the same power would not come anywhere near producing power as efficiently as this. The same is true with an electric bulb. Take some of the early carbon filament bulbs as an example: With these bulbs the current consumption would be very close to five watts per candle-power unit. With the very latest type of argon gas filled bulbs, using a tungsten filament the current will be less than 1.50 watts per candlepower unit. The unit of candlepower considered is the mean spherical candlepower. Even considering this latest type of bulb the efficiency of the lamp is no more than 10 per cent, so you see that the whole question is a comparative one.

**2**—This we cannot say. A carbon lamp of 100 watts will produce about this

### CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age

**T**HIS Department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by some one else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

### The Electric System

much light. A tungsten lamp of the latest design consuming only about 40 watts will produce the same light.

#### MAGNETO TROUBLE

**Q**—On a 1911 Michigan Model H equipped with a Briggs magneto the bearings are plain and oiled by a wick from a tank under the magneto. The oil holes on the rotor or armature became filled with dirt so the magneto was carefully removed noting the marks on the gears, etc. The end plate was removed, rotor and bearings were cleaned and then replaced. The car runs well on dry cells but refuses to run on magneto. Why?—Ralph K. Hardy, Howell, Mich.

It is very difficult to answer a question of this sort because there might be a number of things wrong and we, through ignorance of the conditions, might be able to suggest only one or two possibilities, and be wrong at that. You state, of course, that the rotor was replaced in the exact position that it was end. Is there any possibility that it might have been replaced say 180 deg. out of the way. In this way, it would be possible to make the replacement according to your markings, and still be wrong. If two marks were made this would be entirely possible. So we suggest that you turn the rotor around 180 deg. and then try the machine. Is the breaker operating correctly? It might be that the breaker points are opening too soon or too late by a considerable margin and this destroys the spark entirely, because the breaking of the flux in the primary would come too soon or too late to be of any value in the secondary.

#### APPERSON DIAGRAM

**Q**—Publish wiring diagram of the Apperson.—Leslie Saxton, Sharpsburg, Ky.

The Remy system on the 1918 Apperson is shown in Fig. 1.

#### GENERATOR INSTALLATION

**Q**—A 1912 Chalmers equipped with a Prest-O-Lite gas lighting and dual magneto using four dry cells for starting with the air starting system has been run 9130 miles. Am changing this system entirely, that is, have a 6-volt 80 hour starting and lighting battery for head, dash and tail lights and the ignition system for starting. Desire to install a generator, either Auto-Lite or Wagner to be run from line shaft that runs the pump and magneto by installing a split gear on shaft with chain drive to generator. Give the proper wiring, from generator to cut-out regulator to battery, from battery to Bosch magneto and return to coil. Will the ground from the coil to the engine be sufficient or should the battery have a separate ground to the frame?

**2**—What should be the gear ratio on shaft and generator? About 2 to 1?—R. S. Price, R. S. Price and Son, Auto Repair Shop, McComb, Miss.

**1**—The thing to do in this case is to take the matter up with the manufacturers of the generator which you intend to install, being sure to give them all of the details. A diagram of the Bosch dual system was given in the April 29 issue of MOTOR AGE. The connections to be made from generator

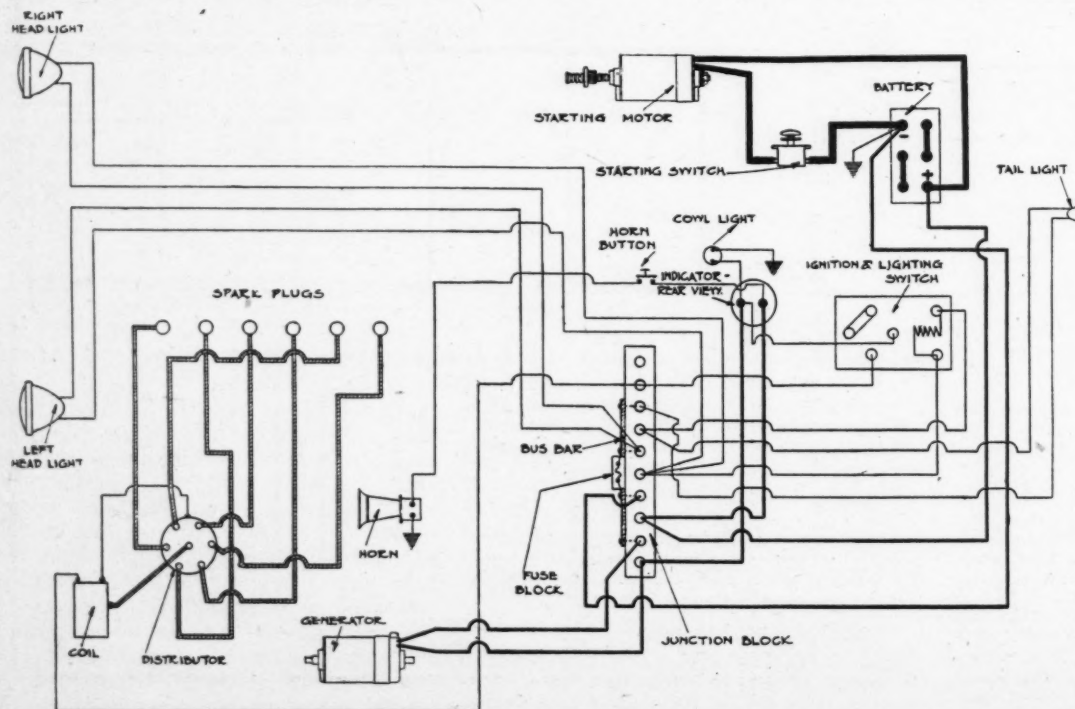


Fig. 1. Remy system used on the 1918 Apperson



to regulator and battery will be furnished by the manufacturers of the generator. As shown, one side of the battery must be grounded.

2—The speed at which the generator should be run will vary with the design of the machine and you will therefore have to supply the necessary gearing after the purchase of the generator.

### VOLTAGE REGULATOR TROUBLE

Q—The Westinghouse generator Frame No. 208, style S. W. 2374, serial No. 1615099, which belongs on a 1916 National series A. C. double wire system has a new field coil but will not generate when on the car and running the regulator or cutout vibrates. When connected to a battery as a motor it runs with a jerky motion fast for half time and slow for half time. What is the trouble?—O. E. Walker, Otto Walker's Auto Shop, McGehee, Ark.

We believe that the polarity of one of the field coils has been reversed which would cause a reduction of current in the cut-out and it would take some time to build it up. When the current does build up the cut-out will open, the current drop down and the machine will slow down. Check up the wiring according to the wiring diagram given in Fig. 2.

### ARMATURE REWINDING

Q—Where can a book of instructions on the rewinding of armatures for generators and starters be obtained?—C. B. Roy, Lafayette, La.

So far as we know, there is no publication covering this subject.

### RECHARGING FORD MAGNETS

Q—If it is possible to charge a Ford magneto with dry cells show a diagram.—Amedee Roussrau, Eagle Butte, S. D.

The Ford magneto can be recharged with dry cells if about 20 cells are connected in series. This ought to give about 32 volts. Instructions and diagram for recharging were given in the April 15 issue of MOTOR AGE.

### AMMETER TROUBLE

Q—During cold weather the ammeter does not function until after the car is warmed up. It is a Ford equipped with a Disco starter.—Reader, Aberdeen, S. D.

There is no reason why the cold weather should have any effect on the action of the ammeter. Go over the electrical system carefully and see that all connections are tight. Examine the cut-out and inspect the brushes and commutator. If the commutator is found dirty clean it with fine sandpaper while the engine is running.

### GENERATOR POLARITY REVERSAL

Q—What are the different reasons for causing the polarity on a generator to reverse itself?

2—Give formula for determining the size of speedometer fibre gear (the number of teeth it should have) when changing tires from 30 by 3½ to 31 by 4 to ascertain the proper reading.—C. B. Roy, Lafayette, La.

1—The generator connections to the battery should be positive pole of generator to positive pole of battery and negative pole of generator to negative pole of battery. If the connections are reversed it would appear that this series connection would give double the voltage, but this is not the case. On the

To assist readers in obtaining as a unit all information on a certain subject, MOTOR AGE segregates inquiries in this department into divisions of allied nature. Questions pertaining to engines are answered under that head and so on.

### THE ELECTRIC SYSTEM

Earl Shippy	Oran, Iowa
Ralph K. Hardy	Howell, Mich.
Leslie Saxton	Sharpsburg, Ky.
R. S. Price, R. S. Price & Son Auto Repair Shop	McComb, Miss.
O. E. Walker, Otto Walker's Auto Shop	McGehee, Ark.
C. B. Roy	Lafayette, La.
Amedee Roussrau	Eagle Butte, S. D.
Reader	Aberdeen, S. D.
C. B. Roy	Lafayette, La.
O. A. Kauffman	Ceres, Calif.
Ivan Blackledge	Fredericktown, Ohio
Emil Yulick	Berkeley, Calif.
Geo. Flanagan	Phillipsburg, Kans.
Alex McBeath	Washoe, Mont.
Scott F. Aitken	Hood River, Oregon
W. R. Marett	Fair Play, S. C.

### MISCELLANEOUS

Harry C. Sawtell	Colo, Iowa
R. Hagemeler	St. Louis, Mo.
Dryden Williams, Rudnick-Williams Tire Co.	Washington, D. C.
Walter Lane	Hennings, Ill.
Scott F. Aitken	Hood River, Oregon
Rudolph Chevallier	Washington, D. C.
Fred P. Lesoing	Hickman, Neb.
Clyfton B. Norris	Willow Shade, Ky.

### ENGINES

L. S. Honsaker & Son	Masontown, Pa.
Maurice W. Brown	Alameda, Calif.
Herman Meyers	East Moline, Ill.
Scott F. Aitken	Hood River, Oregon
Gerald R. Isphording	Cincinnati, Ohio

### CARBURETION

Harold Denney	Grimes, Iowa
Bradford Auto Company	Bradford, Iowa
J. H. Jensen	Woonsocket, S. D.
Scott F. Aitken	Hood River, Oregon

Remy system the battery voltage would be sufficient to influence and control the generator polarity and the generator would soon reverse itself—the ammeter would, however, read in the reverse direction to what it had previously. On other systems the field would not reverse readily and the ammeter would swing back and forth due to the vibration of the cutout switch. The generator in this case would build as it normally would until it reached sufficient voltage to close

the cut-out switch. The moment this closed the strength of the field would decrease, consequently output of the generator would drop until a point where the cut-out switch would automatically release, then the same action would continue, causing the cut-out switch to vibrate. In many instances, merely holding the cut-out switch down a few minutes will cause a reversal of the polarity of the fields.

On some of the late Delco types the polarity of the generator would be reversed and no serious harm would result. On the early type Delco which used the cut-out the action would be as described above. It has been found that in systems using third brush regulation that if the battery becomes entirely discharged or a very weak battery is connected to the generator where no two absolutely distinct opposite polarities are present that there is a possibility of the generator building up in either direction.

2—The fibre gears used by the Stewart-Warner company all have the same number of teeth. The number of teeth to be used on the driving gear is determined by multiplying the diameter of the wheel in inches by 2. That is, if you have a 30-in. wheel there would be 60 teeth on the driving gear.

### MAGNETIC METALS

Q—Can brass, copper, nickel, silver or gold be attracted by magnetism?—O. A. Kauffman, Ceres, Calif.

Nickel is the only one of the above mentioned that has magnetic, and therefore is the only one which will be attracted by magnetism.

### PRE-IGNITION KNOCK

Q—What causes a knock in an engine when a spark plug is short circuited? This knock is not noticeable otherwise.—Ivan Blackledge, Fredericktown, Ohio.

If the spark plug is short circuited it is probably a case of pre-ignition. At the present time there are a great many mistaken ideas about knocks and their causes. You will find that most knocks

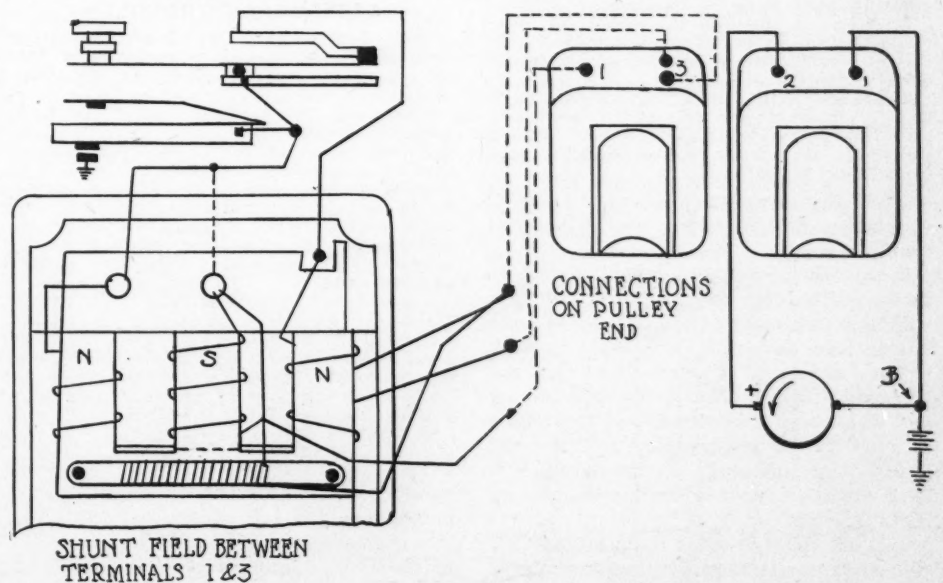


Fig. 2. Showing the proper connections from generator to cut-out and connections in the cut-out

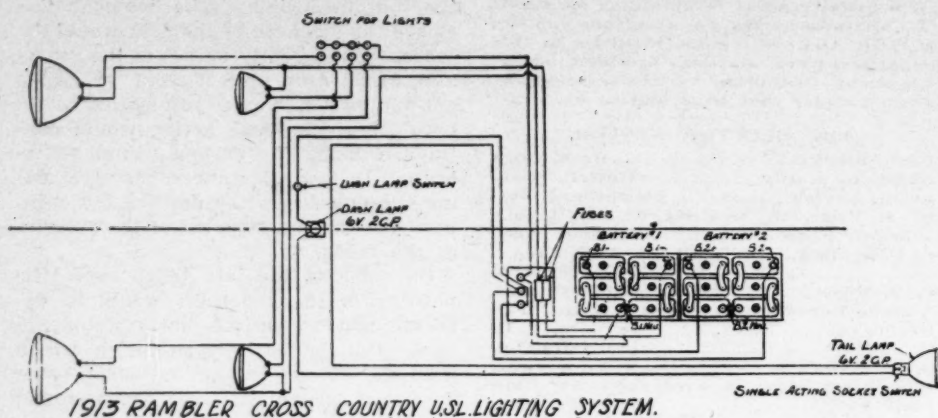


Fig. 3.

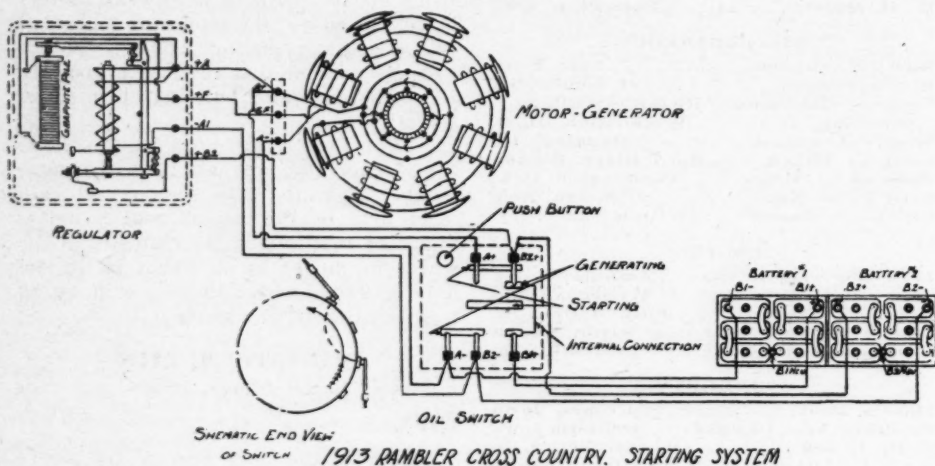


Fig. 4.

are not caused by pre-ignition but are fuel knocks. If the spark plug becomes sooted and carbon forms shorting the plug, the carbon becomes so hot after a short time of running there is pre-ignition.

### STORAGE BATTERIES

Q—Is there an automatic cutout or relay on cars of standard make that will automatically cut out and not overcharge a battery as long as the generator is running at a generating speed?

2—What is the general cause for batteries being short lived, particularly in the summer time when cars are being used a great deal?

3—Occasionally I find tourists who have battery trouble, one cell being dead and the others fully charged. What causes this?—M. J. Barton, Lusk Battery Station, Lusk, Wyo.

1—So far as we know, there is no such regulating device in use at the present time.

2—In the summer most motorists make quite long trips. As a rule you will find that most of the driving is done during the day and very little driving is done at night. The result is that the battery gets over charged and heats up and in a short time the life of the plates is gone. It is good policy to burn the lights while driving in the daytime if long distances are covered without any night driving.

3—This simply means that the one cell is defective. It may be that the plates have buckled and caused a short or perhaps the jar is cracked. One dead cell when the others are all right may be a

result of the insulation being destroyed. The remedy is to watch overheating and overcharging and keep the electrolyte up.

### RAMBLER WIRING DIAGRAM

Q—Publish wiring diagram of the 1913 Rambler, Cross-Country model.—Emil Yulick, Berkeley, Calif.

The U. S. L. starting and lighting system used on the cross country Rambler are shown in Figs. 3 and 4.

### ELECTRICAL TROUBLES

Q—When a 1917 Overland Model 90 stands idle the ammeter registers a discharge of 2 amperes. What is the cause of this?

2—Should the battery drop from 1.275 to between 1.225 and 1.250 when the engine has been idle for 10 days, car standing in garage during the time.

3—How long would it take the engine to boost up the battery from 1.225 to 1.275 with engine running while car is in garage, the ammeter registering 10 amperes. G. H. model Auto-Lite generator is used.)

4—Is there anything wrong with an Auto-Lite generator model G. D. on an Overland 85-4 when the ammeter is at zero and running 10 m.p.h. on high gear, the ammeter registering 11 amperes while traveling at 25 m.p.h.?—Alex McBeath, Washoe, Mont.

1—This indicates that the pointer is bent, insulation on the wires injured causing a ground or short circuit, or the cut-out points are stuck. To calibrate the ammeter, connect another ammeter in the circuit and compare the readings of both instruments. If they are alike it is quite certain that the ammeter is all right. Examine the cutout points and if

found in good condition this reading is probably caused by a short circuit.

2—This depends to a great extent on the condition of the battery. If the battery is in good condition and not over a year old it ought not drop more than 30 or 40 points in a month. However, if the plates are sulphated a great drop may occur in a short period of time.

3—This will vary considerably, depending upon the condition of the battery and the charging rate of the generator. It is not a satisfactory method, and the proper thing to do is to remove the battery and charge it from an external source.

4—The generator should be charging some at 10 m.p.h. The fact that it does not is not an indication that there is anything wrong with the generator. It is more apt to be caused by worn brushes, poor brush contact or a dirty commutator. It would be well to examine all connections carefully as well.

### GENERATOR INSTALLATION

Q—Would the replacement of a magneto by a generator to be used only for lights, horn and ignition in connection with the battery on a 1911 National have a tendency to overcharge the battery?

2—Would there be any particular gain in using, if possible, a distributor for eight plugs, this is a 5 by 5 11/16 in. T-head engine.—Scott F. Aitken, Hood River, Oregon.

1—If the car is driven for long distances during hot weather in the daytime and very little night driving is done the battery is very apt to become overcharged and overheated which may result in buckling plates and lessen the life of the battery. This can be overcome to a certain extent by using the lights while driving during the day.

2—The use of a double ignition system has its advantages. It will give more speed, better combustion and greater economy. We do not believe it is necessary to install a double system as very satisfactory results can be obtained with the single system.

### OVERLAND IGNITION TIMING

Q—While driving an Overland 90 it began to pull very hard, and all at once the engine speeded up and acted as if it were out of gear, the car coming to a standstill. The clutch does not slip. It backfires when the crank is pulled up, the spark being retarded. When it is pulled off it will crank, but still fails to pull its own weight. The backfiring indicates that it is out of time. Explain where and why this slipping takes place.

2—Would it be practical to convert a 1914 Cadillac Four into a speedster?—W. R. Marett, Fair Play, S. C.

1—From the description given we believe that the distributor arm has slipped, throwing the ignition out of time. To time, place the spark lever on the steering column to the fully retarded position. The break of the points in the timer should occur at the instant the dead center mark on the fly-wheel is 1 1/4 in. past the mark on the rear end of the motor block. With the fly-wheel in this position, the distributor short-circuiting member should be in alignment with the high tension electrode and the terminal of the wire which leads to the spark plug in the cylinder in which the piston has just completed the compression stroke.



To determine the end of the compression stroke in any cylinder, turn the engine until the exhaust valve in that cylinder, which is the one directly beneath the priming cup, has just reached its seat; then turn the fly-wheel approximately one revolution, stopping when the mark 1-4 2-3

— or — is at its highest position and UP UP

in line with the guide mark on the back of the crank case. Another method is to turn the engine while the hand is held over the open priming cup and identify the compression stroke by the escape of air. After the fly-wheel is in the proper position make the adjustment as directed.

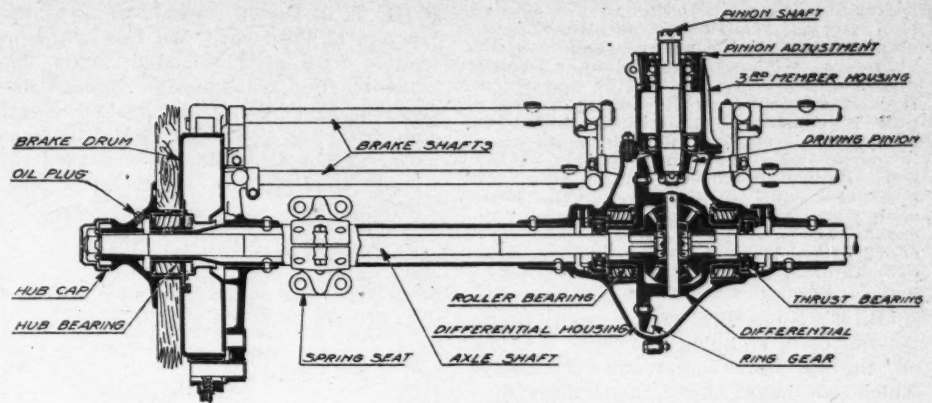


Fig. 6. Sectional view of rear axle on the 1918 Oakland 34 B

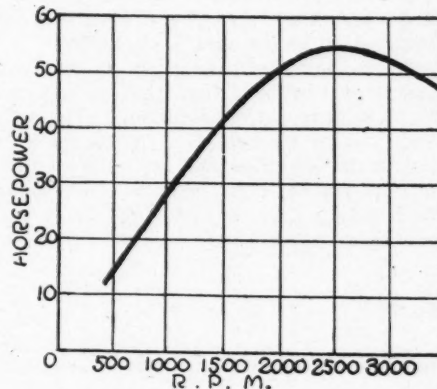


Fig. 7. Power curve of the 1919 Chandler

sleeve to the right the driving pinion moves toward ring gear, thereby taking up any back lash in the teeth of these two gears; turning bearing sleeve to the left withdraws driving pinion from ring gear, causing back lash to increase or make more clearance between the teeth of these gears. This adjustment can be made without removing rear end universal joint. To remove entire third member assembly it is necessary to disconnect rear universal joint and remove the several nuts and lock washers from studs in the rear axle housing.

#### CHANGING TIRE SIZE

Q—Desire to use over size or 35 by 4½ in. tires on a Hudson 6-40 equipped with 34 by 4 in. tires. Desire to cut the wheels down so as to take either a 23 or 24 in. diameter rim and use either 32 by 4½ or 33 by 4½ in. tires. About how much would a change to either of these size tires decrease the speed of the car at a certain engine speed? About what percent increase in power, if any, would be had with a change to either of these size tires?

2—Which of these sizes do you think

would be the better to use? — Dryden Williams, Rudnick-Williams Tire Co., Washington, D. C.

1—If 32 by 4½ tires are used the difference in speed would be only about 3 m.p.h. at say 1000 r.p.m. There would be slight increase in power by using the smaller size tire.

2—We believe the 32 by 4½ is the best size to use.

#### SPACKE

Q—Publish the power curve of the engine used in the Spacke light car.

2—Under normal conditions what would the speed in m.p.h. of the Spacke be?

3—What would be the gasoline mileage?

4—Publish picture of the Packard De Palma broke the world's record in.—Walter Lane, Henning, Ill.

1—Power curve of the Spacke car was shown in the Apr. 22 issue of MOTOR AGE.

2—About 40 m.p.h.

3—The manufacturers claim 40 miles per gallon.

4—Shown in Fig. 5.

#### FIRE EXTINGUISHERS

Q—What size of fire extinguisher do you consider best for a fair sized garage?

2—Is there a book published which has good writeups on service, shop equipment, etc., that could be used as advertisements in local newspaper?—Rudolph Chevalier, Washington, D. C.

1—We believe that the pump type of 1½ quart capacity is the logical size to use if there are men around at all times to use them in cases of necessity. The advantage is that any person can operate this kind of an extinguisher whether he is familiar with it or not while if a larger size is used it will be clumsy to handle and may be quite difficult to operate.

2—The logical thing to do is to take the matter up with the sales department of the company which manufactures the product you wish to sell. They are always in a better position to tell you how to advertise and sell their product than anyone else who might write a book on this subject.

#### READER FINDS TROUBLE

Editor Motor Age—I wish to thank you for the trouble and kindness in answering my inquiry relative to Ford Ignition trouble which you published in the April 15, issue, page 50, and also wish to state that I found where the trouble was, namely: I had a gasoline hand primer on the car which was operated from a plunger type of hand pump which injected gasoline into the intake manifold in a spray form and which enable the engine to start easily when cold. The bad

## Miscellaneous

### SLIPPING CLUTCH

Q—Instruct how to prevent a Buick Model 18 clutch from slipping.—Harry C. Sawtell, Colo., Iowa.

The clutch used on this model is a cone clutch. It consists of a leather faced cone which engages with the inside of the flywheel rim and is held in engagement by three springs, the tension of which can be adjusted to take up the wear of the clutch facing by means of the nuts on the ends of the studs which fasten them to the flywheel. The slipping of the clutch is probably due to the leather being glazed and hard and it is possible that this can be overcome by an application of neats foot oil to soften the leather, but if it is found that this will not remedy the trouble you will have to install a new leather facing on the cone. Before applying the oil the leather should be washed off thoroughly with kerosene either spraying it on the leather or wiping off with a cloth moistened with kerosene.

### HUMMING

Q—A deep humming noise seems to come from the transmission or rear axle on an Oakland 34 B. It is more noticeable when the car lists to the right side of road. The bevel and pinion gears have been inspected.—R. Hagemeyer, St. Louis, Mo.

Any excessive humming noise whether it comes from the transmission or the differential is probably a result of worn gears or bearings which give poor adjustment and may throw the gears out of line. To adjust driving pinion and ring gear loosen lock Fig. 6 which holds front bearing sleeve in front end of third member and by turning the bearing

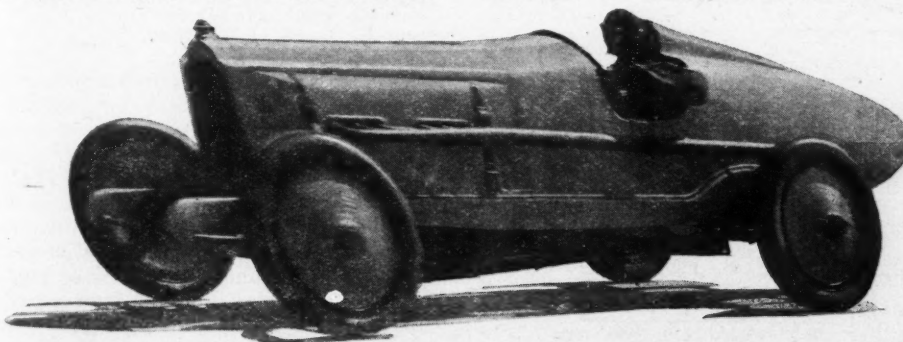


Fig. 5. View of De Palma's Packard 905

feature of it was that during the admission stroke it sucked a certain amount of gasoline past the plunger and into the cylinders without the plunger being operated and when the engine was warm it was excessive, while under a heavy pull it consumed enough of it not to cause an irregular running, but when idling or when not on a hard pull the irregular running of the engine was very noticeable, and upon removing the head each time found an excessive amount of carbon on valves and pistons in a very short time. Removed the primer so now everything is O. K.—W. H. Ahrens, Automotive Specialist, Yonkers, N. Y.

**Editor's Note—Primers are many times the source of trouble. We were not told of the primer equipment originally, which we have found through experience is very often the cause of low fuel mileage.**

#### RIM SIZES

Q—Would it be possible to replace the 36 by 4 in. quick detachable rims on a National 1911 with 36 by 4½ demountable straight side rims.—Scott F. Aitken, Hood River, Oregon.

Yes.

#### CRANKING FORD CAR

Editor MOTOR AGE—In the March 18 issue of MOTOR AGE about the grief of

H. H. J., of Ogden, Iowa, had in cranking a 1912 Ford car. We had the same trouble with a 1910 model. After dismantling the transmission it was discovered that the transmission clutch disc drum set screw No. 3344 had come loose. Tightening the screw caused the trouble to disappear.—Fred P. Lesoing, Hickman, Neb.

#### STRIPPING GEARS

Q—What causes a Maxwell 1915 to jump back into neutral after it is shifted into gear?

2—This car also strips the gear. New rear axle housing, etc., were installed but to no avail. How can this be remedied?—Clyfton B. Norris, Willow Shade, Ky.

1—This is probably caused by worn dogs and they may be dressed up or squared so as to hold by grinding.

2—Stripping of the gears is likely a result of worn bearings that permit the shaft to drop out of alignment. The only way it can be remedied is to make a thorough examination of the entire power transmission system and make replacements or adjustments as found necessary.

### Engines

#### HERSCHELL-SPILLMAN ENGINE

Q—Publish the horsepower and torque curves of the new four-cylinder Herschell-Spillman engine, Model 700, Type 1, bore and stroke 3½ by 5 in.

2—We wish to mount a new engine in a special touring car of 112 in. wheelbase, 32 by 4 in. wheels, 4.75 to 1 gear and the weight of the chassis and body complete without engine being 2150 lbs. We are considering using either a Falls 3½ by 4½ six-cylinder engine or the Herschell-Spillman 3½ by 5 four-cylinder engine. Which do you think would give the best results as to speed and hill climbing ability?—L. S. Honsaker & Son, Masontown, Pa.

1—Shown in Fig. 9.

2—We are in no position to make any statements of comparison between these two engines. It must be remembered that the engine is not the only factor that governs speed acceleration and hill climbing ability. Both of these engines have their advantages, and your decision will have to be made from an opinion formed by a careful consideration of both designs.

#### PISTON MATERIAL

Q—Considerable difference of opinion seems to exist in regard to the relative merits of aluminum and cast iron pistons. Of course the former has less weight and in this has an advantage. Amongst those competent to judge, what are the disadvantages claimed against

aluminum as a material for piston manufacture?—Maurice W. Brown, Alameda, Cal.

It has been said that had aluminum pistons not been developed, the Allied nations could not have done what they did in aerial warfare, neither could the enemy nations. The chief reason why aluminum pistons were and are used in the airplane engine so extensively, is

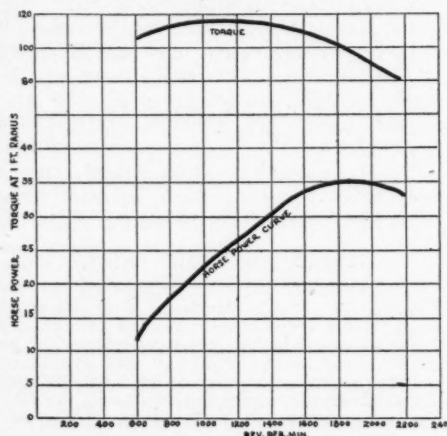


Fig. 9. Horsepower and torque curves of the Herschell-Spillman engine, bore and stroke 3½ by 5 in.

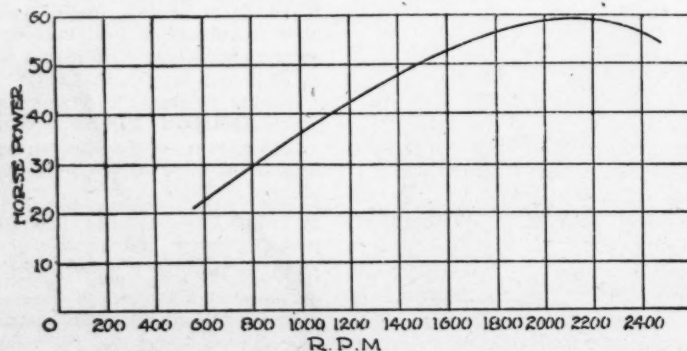


Fig. 8. Horsepower curve of the 1920 Buick engine, bore and stroke 3⅜x4½ in.

that aluminum has the property of being able to dissipate heat so rapidly. The heat absorption powers of aluminum are about twice that of iron. An airplane engine running at full speed most of its life generates a great amount of heat and all this must be gotten rid of. So aluminum is used. The weight factor is a secondary consideration in an airplane engine, that is as far as the pistons are concerned. While it must be admitted there is some weight saved through the use of aluminum pistons in an airplane engine, still this would not be over thirty-five or forty pounds for a twelve cylinder engine.

For a motor car where weight is not such an important factor as in an airplane engine, it is not essential to cut down thirty pounds just for the sake of getting rid of the weight. Here the heat dissipation qualities of the aluminum pistons again enter and make them valuable. The reduction of weight is beneficial for the airplane engine and motor car engine, but it is felt that these benefits are secondary to the heat factor of aluminum. With a very heavy piston it is found that a connecting rod will wear on the bottom side of the rod faster than the upper side. This means that the cap of the rod is the fastest wearing member which seems to be contrary to all reasoning. But it should be remembered that the explosion within the combustion chamber is not the force that creates the greatest stress on the connecting rods. The upward force and momentum of the piston and the rod tending to carry the crankshaft with it on the exhaust stroke is by far the greater. When lighter weight reciprocating parts are used this excessive wearing of the cap is overcome.

#### BUICK POWER CURVE

Q—Publish a horsepower curve of the latest Buick five-passenger.—Herman Meyers, East Moline, Ill.

Horsepower curve of the Buick is shown in Fig. 8.

#### CHANGING OIL GAGE

Q—Could the sight oil feed on the dash, which soon becomes sight unseen, be replaced with a gage similar to the dial on the late model National cars? This is a 1911 model.

2—Publish power curve of the 1919 Chandler.

3—What speed should the 7-passenger touring car attain on paved roads?

4—At from 25 to 30 m.p.h. on good roads there is a slight vibration similar to that when chains are used. Apparently with each rear wheel revolution. No ill-shaped tires to cause it. This vibration has been noticed since the drive pinion was replaced.—Scott F. Aitken, Hood River, Oregon.

1—The late model National cars with the exception of the 12 cylinder cars are provided with the same kind of an indicating device although it may differ slightly from the one you have. The oil is pumped from the lower half of the crank case to the upper half and is automatically carried at the same level at all times by stand pipes of fixed height which connect the upper and lower parts. In the 12 cylinder models the lubrication is full force feed and the oil is under pressure. The gage on the dash



indicates the pressure in the oil line and we presume that this is the kind of a gage you refer to. Of course you cannot install a pressure gage on your car. If the lubricating oil is in good condition and the system clean there is no reason, whatever, why it should not be possible to tell when the oil pump is working at all times.

2—Shown in Fig. 7.

3—About 65 miles per hour.

4—We think that you are imagining this vibration as there is no reason why there should be any excessive vibration. If the gears in the transmission are out of line or if the differential gears are out of line or adjusted too tight there would be excessive hum but not vibration. It is adherent characteristic of engines to develop a critical period of vibration. In some cases it occurs at a car speed of about 40 miles per hour and in others at 50 or 55 miles per hour. It was claimed that the Sunbeam racing team withdrew their cars at the Indianapolis race last year because the engines developed a critical period of vibration which interfered very seriously with their chances of winning the race. However it is nothing to worry about and it is interesting to note that in some cases this vibration disappears at speeds above which the critical occurs.

#### OIL PRESSURE ADJUSTMENT

Q—Explain the method of adjusting oil pressure on a 6-cylinder 1919 Oldsmobile Model 37.—Gerald R. Isphording, Cincinnati, Ohio.

The oil is fed under pressure to the main and connecting rod bearings of the engine. To prevent the pressure of the oil from rising too high, a spring controlled overflow valve known as a pressure regulator, is provided. The pressure regulator, which is located on the left hand side of the engine, near the bottom of the crankcase, is set when the car is assembled and requires no further attention except that it may be necessary occasionally to remove the valve from the regulator and clean the valve and its seat, as well as the by-pass hole.

The amount of pressure indicated by the pressure gage on the instrument board varies with the speed and temperature of the engine and the viscosity of the oil. When the engine is warm and supplied with fresh oil, the pressure as indicated by the gage should be from five to seven pounds when the engine is idling. At higher speeds a corresponding higher pressure should be indicated. Before the engine has become warm, higher pressure will be indicated at given speeds. In other words, maximum pressures will be indicated at given speeds when the engine is cold and the oil is fresh; minimum pressures, when the engine is hot and the oil becomes thin from use.

## Carburetion

#### STROMBERG ADJUSTMENT

Q—Instruct how to adjust the Stromberg model G 2 used on a Lewis Six?

2—Where can repair parts for this car be secured?

3—What make of engine, rear axle and transmission was used in this car? —Bradford Auto Company, Bradford, Iowa.

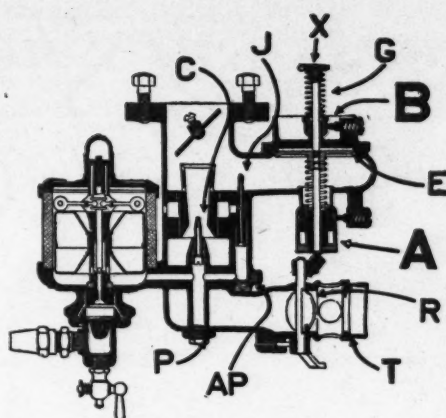


Fig. 10. Sectional view of the Stromberg G 2 carburetor

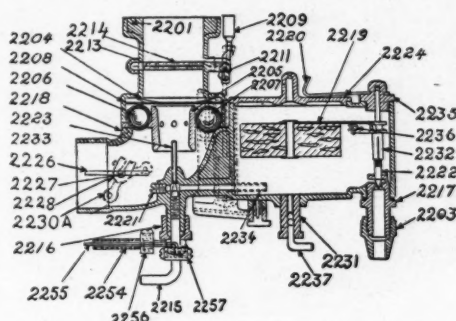


Fig. 11. Sectional view of the 1919 Mayer carburetor

1—There are two adjustments that need attention, Fig. 10, "A" the low speed nut, and "B," so there is at least  $\frac{1}{8}$ -in. clearance between the spring "G" and the nut "X" above it. Set the low speed nut "A" so the air valve "E" is seated lightly.

Start the engine, first closing the choker valve "R" in the air horn by the control provided. Open this as soon as the engine starts and keep open while the engine is running. If the engine does not start on the third or fourth turn of the crank open this valve and the engine should then run.

Do not adjust carburetor until the engine is thoroughly warmed up. When the engine is warm and with spark retarded adjust nut "A" up or down until the engine runs smoothly at low speed. To determine proper adjustment open the air valve with finger by depressing "X" slightly. If when so doing, the engine speeds up noticeably it indicates too rich a mixture and "A" should be turned down notch by notch. If, on the other hand, the engine dies suddenly when slightly opening the air valve it indicates too lean a mixture, and "A" should be turned up until this is over.

To adjust the high speed adjustment advance the spark to the normal position and open the throttle gradually. If the engine backfires through the carburetor it is a positive indication of too lean a mixture and the nut "B" should be turned up notch by notch until this is overcome. If the mixture is too rich, as indicated by a loading of the engine, and heavy black smoke from the exhaust, turn "B" down until the engine

operates properly. A further test for the correct mixture at high speed can be made by depressing the air valve when the engine is running at this speed. If when so doing the engine speeds up it indicates too rich a mixture; if the engine runs slower, too lean a mixture. Turning either adjusting nut up means a richer mixture or more gas. Down means a leaner mixture or more air.

2—Parts from this car can be had from V. A. Longaker Co., 447 N. Capitol Ave., Indianapolis and Puritan Machine Co., 409 Lafayette Blvd., Detroit.

3—These parts were made by the maker of the car.

#### MAYER CARBURETER ADJUSTMENT

Q—Publish instructions for adjusting a 1919 Mayer carburetor.—J. H. Jensen, Woonsocket, S. D.

To adjust the Mayer carburetor pull out the dash adjustment button, open throttle wide, then close to within 2 or 3 notches, pull out starting valve wire and hold out while turning over engine; release wire immediately when the engine starts. During cold weather dash adjustment button 2251 should be pulled out and left in this position for several minutes; after the engine is thoroughly warmed up this may be re-adjusted to point where best results are obtained when running.

To get the proper speed for idling, adjust throttle adjusting screw 2211, Fig. 11.

To adjust for proper mixture loosen binding screw on lever 2257, move plunger 2251 to about middle of travel, then adjust needle valve 2215 to point where it gives best results, which is about  $\frac{1}{4}$  to  $\frac{3}{8}$  of a turn, then tighten binding screw on lever 2257.

It is advisable to run as much as possible with dash adjustment plunger 2251 all the way in as it gives best economy.

The gasoline level is right when the float stands level with carburetor, when pointing upward level is high, when pointing downward level is low; if float requires adjusting remove gasoline valve cap 2235, lift out gasoline valve 2222, on which is screwed gasoline valve spring nut 2232, which is screwed upward to lower level, and downward to raise level. When placing gasoline valve 2222 into position, see that bar on float hinge enters groove on gasoline valve spring nut 2232.

#### CARBURETER CHANGES

Q—We have attached a hot air stove to the intake manifold and connected a hot water line to the carburetor on a 1911 National. Should that be enough heat?—Scott F. Aitken, Hood River, Oregon.

So far as heat is concerned this ought to be sufficient. However, with fuel as it is to-day it is hardly logical to think that a 1911 carburetor will provide efficient carburetion. The intake passage is undoubtedly very long and it will allow a lot of condensation. It is advisable to install a new carburetor and if possible a manifold of the hot-spot type. This is based on the fact that some carburetor companies are recommending changes in the size of the jets for all carburetors built previous to 1915.

# The Accessory Show Case

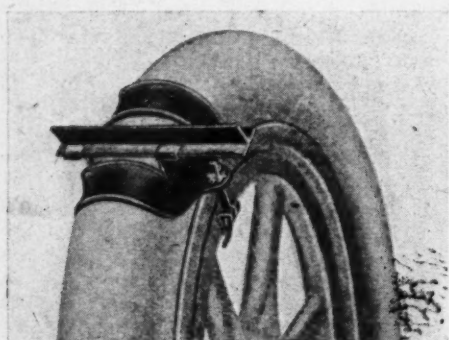
## New Fitments for the Car

### Peerless Tool Box

There is a noted increase in stealing of tires, tools, chains and accessories of all kinds that are left insecure in automobiles unattended. The tool box shown is the product of Corcoran Mfg. Co., Cincinnati, and was primarily designed for the carrying of tools, but its usefulness is increased by the motorist who carries his chains and other valuable equipment in it. This box is of convenient size—22 in. long, 9 in. wide and 7 in. deep. It is constructed with a full finished steel body

### Dickinson Mud Lug

The mud lug shown has several interesting features. It can be attached or detached very quickly; it can be adjusted to fit any rim; one set of four lugs can be carried in a space 8 by 8 in. and 5 in. deep—it will not mar the paint or injure spokes or rims. The lug shown is manufactured by the Liberty Mfg. Co., Chicago Heights, Ill.



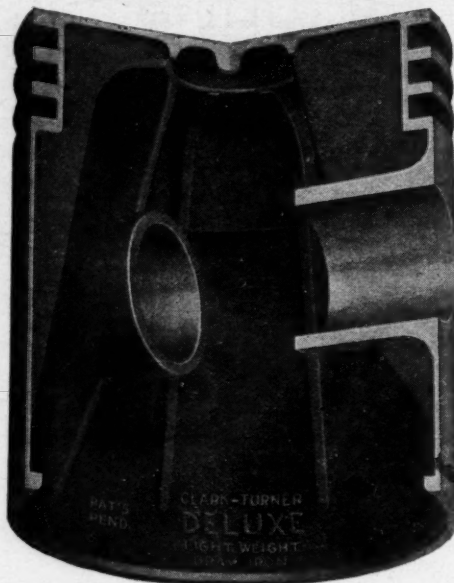
Dickinson mud lug to secure traction in heavy going

### Clark-Turner Piston

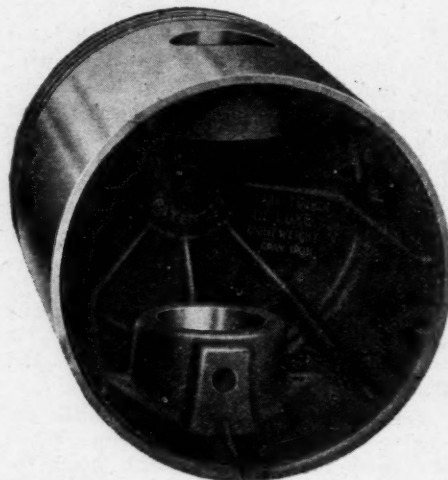
The Clark-Turner DeLuxe grey iron piston is a highly developed form of piston that is extremely light in weight, the lightness of weight being obtained by scientific construction. The interior of the piston is ribbed with a great number of small reinforcing bands, thus producing a light weight piston that is very strong. This piston is furnished for all makes of motor cars, trucks, and tractors and is manufactured by the Clark-Turner Piston Company, 1246 South Los Angeles St., Los Angeles, Cal.

### Econometer

The implement shown will give the driver a direct showing without calculation how many miles per gallon his car is making, the amount of gasoline in the tank, the amount of gasoline used during the season, the season mileage, trip mile-



Sectional view of the Clark-Turner piston



Clark-Turner grey iron piston is ribbed with reinforcing bands to secure light weight and strength

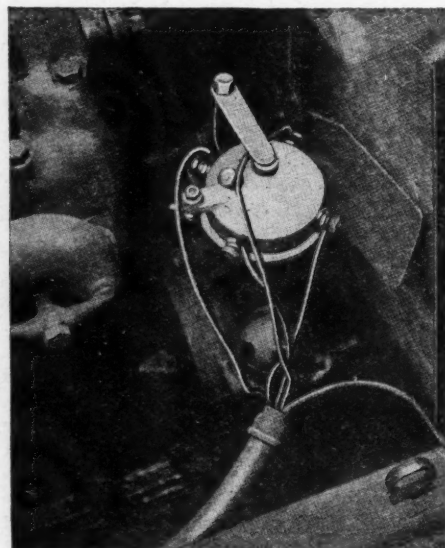


The Econometer tells the owner his gasoline mileage, the amount in the tank, the amount used all season and speedometer readings

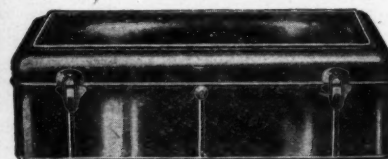
age and the miles per hour. It is inexpensive, simple, accurate and can be easily attached to any car. It is manufactured by Thompson & Stuber, Rochester, N. Y.

### Timer Extension Bracket

It is claimed that about 90 per cent of timer trouble in connection with Ford cars is caused by the wires becoming saturated with oil and water resulting in the destroying of the insulation and the occurrence of short circuits due to the exposed wires coming in contact with metal parts. The extension bracket shown brings the timer wires up to where they are away from the fan belt and the dirt and grease. Its construction is simple and it can be installed in about thirty minutes. This bracket is manufactured by the Milwaukee Air Pump Co., 886 Third St., Milwaukee, and lists at \$6.



Timer extension bracket raises the Ford timer out of the dirt and oil



To protect tools, chains and other smaller articles of equipment, from being stolen, this tool box has a secure lock



# Service Equipment

## Time Savers of the Shop

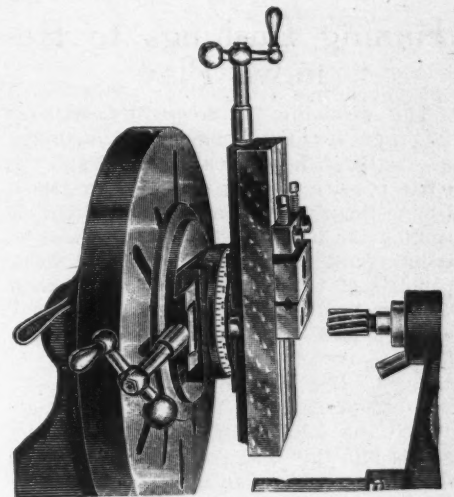
### Fairbanks Radiator Repair Outfit

The radiator needs its assortment of tools, and while the radiator tools are not as specialized in their application as the electric system tools, for instance, yet they are highly necessary. The radiator tools are not what might be called exclusively adapted, for such articles as pliers, hammers, tin snips, files, and a soldering iron, are generally available around the shop. But the idea is that the collection of the proper assortment is the valuable feature in this case. The radiator testing stand with the pressure gage for testing purposes is one of the specialties of the outfit that is shown in the illustration herewith. This tool set is distributed by the Fairbanks Co., New York. The various articles in the outfit comprise:

1. Dent Puller or Tube Holder; 2. Fiber Brush; 3. 12-in. Mill File; 4. Hacksaw for cutting tubes; 5. Radiator test plugs, radiator test plug, inlet test plug, outlet test plug; 6. Stretch-all dent puller; 7. Weight for holding overflow tube down while soldering; 8. Tube 9. Tube regulator; 10. Fin comb; 11. Fin spacer; 12. 10-in. square nose plier; 13. Weaver's plier; 14. Acid brush—salammoniac; 15. Rivet bucker; 16. Acid jar; 17. ½-in. rat-tail file; 18. 8-in. shears; 19. Fin and header bar; 20. ¼-in. punch; 21. Tube cleaner. 22. Soldering iron. 23. Cold chisel; 24. Small tinner's hammer; 25. Radiator Bloc, 8 in. sq. 4 in. deep.

### Davis Milling Attachment

All service stations are not equipped with milling machines but most all have upright drilling machines. The Davis



Davis milling attachment

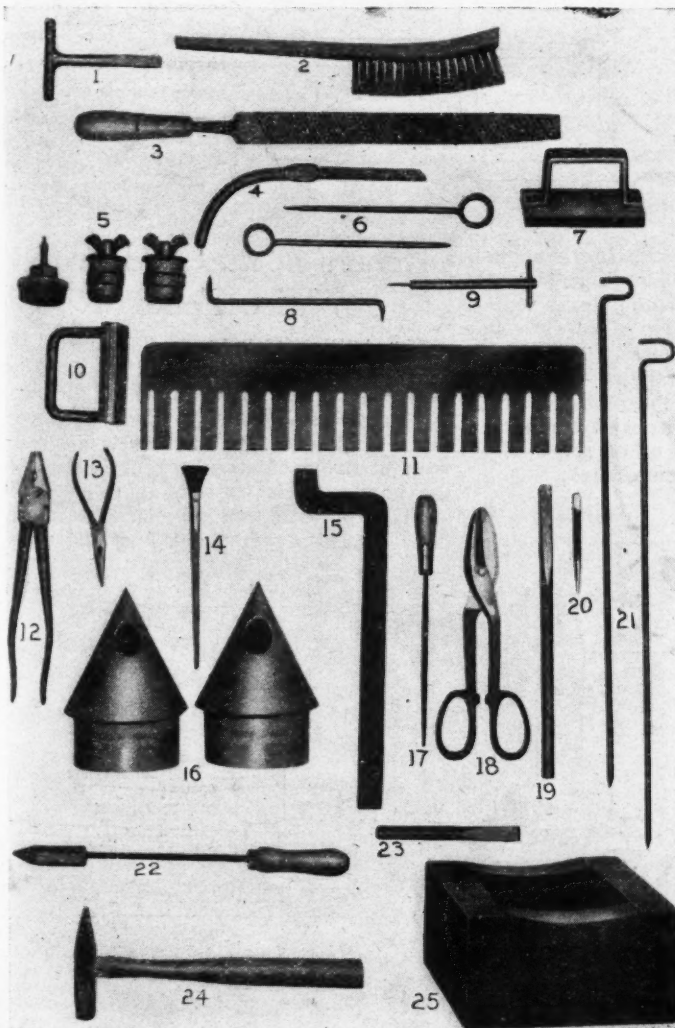
milling attachment and compound table shown in the illustration is intended to be attached to any upright drill press of any size from 14 in. to 42 in. swing. This attachment can be completed in a few minutes' time and it converts your drill press into a vertical milling machine that will do about 90 per cent of the lighter as efficiently as a high priced milling machine. The manufacturers are the Hinckley Machine Works, Hinckley, Ill.

### Felt Washer Display Board

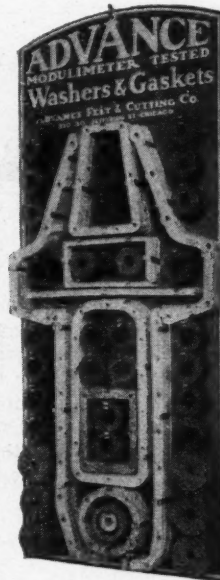
The display board shown has four distinct points of merit—they keep the goods in fine shape—take up practically no space—the goods to a great extent sell themselves—you just what you have and where it is, and so does your customer. Any service station will find that a board of this kind will aid greatly in efficient servicing. It is manufactured by the Advance Felt & Cutting Co., 323 S. Jefferson street, Chicago, and is listed at \$35.

### Victory Piston Ring Compressor

This is a labor saving device for every service station mechanic. It eliminates the breaking of piston rings and prevents injury to operator's hands and enables anyone to perform this hitherto operation with speed. The handles of the compressor are stamped from high quality steel. The adjustable band is in one piece and made from spring steel. It can be used in all types of engines for inserting piston in either top or bottom of cylinder. It is manufactured by the Victory Ring Compressor Co., Grand Rapids, Mich., and sells for \$2.



The Fairbanks radiator repair outfit



Felt washer display board



Victory piston ring compressor

# The Automotive Repair Shop

## Practical Maintenance Hints

### Tinning Bushings to Remove Play

The mechanic is frequently without facilities for the removal of bushings especially if the sizes are special and the parts require turning up from bar stock. Under these conditions the expedient of tinning the inside of the bushing will be found simple and satisfactory. This work consists of wiping the surface over with tinning acid (muriatic acid and zinc) using a swab or brush. Only the surface to receive the tinning coat is cleaned. If a number of parts are to be treated, prepare all at the same time.

Melt the solder in a ladle and dip the pieces into this if the size permits, if not the molten solder can be poured through the bushing. A thin coating will adhere to the surface and if a surplus amount is deposited the spindle or pivot bolt can be driven through cutting the metal smooth and making a perfect bearing. A tinned bushing as described will last exceptionally well when plentifully supplied with oil. In overhaul work on old cars this stunt will save both time and expense, and the tinning of the bearings can be carried out as often as is desired, serving practically as well as a babbitted bearing.

### Replacing Piston Rings

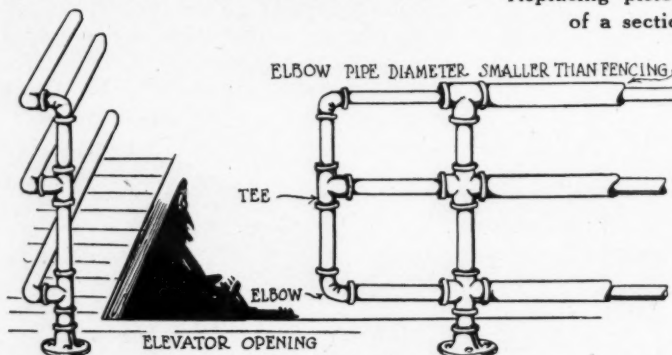
While the removal of piston rings is a simple job if these are not to be used over again, as catching hold of the end of the ring and pulling them breaks the piece and it drops off, putting them on requires some patience. One repairman put rings on pistons with a piece of stove pipe, that was both rapid and safe.

A section of the pipe with the cor-

rugated end, about eight inches long, was placed over the piston. The rings were slid over this and down into their respective grooves. A piece cut out of the length of the pipe decreases the size to that of the piston. A part of the broken ring served as a scraper to clean dirt and carbon from the grooves before putting in the new rings.

### Sliding Gate to Economize In Space

When it is desired to economize in space in the garage and pipe railing fences or partitions are erected or to protect against accidents at the opening for the hoist or elevator, a gate as shown

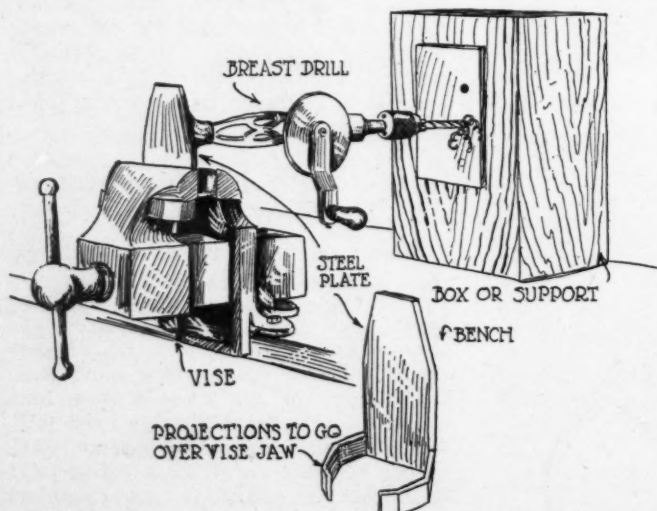


Replacing piston rings with the aid of a section of stove-pipe

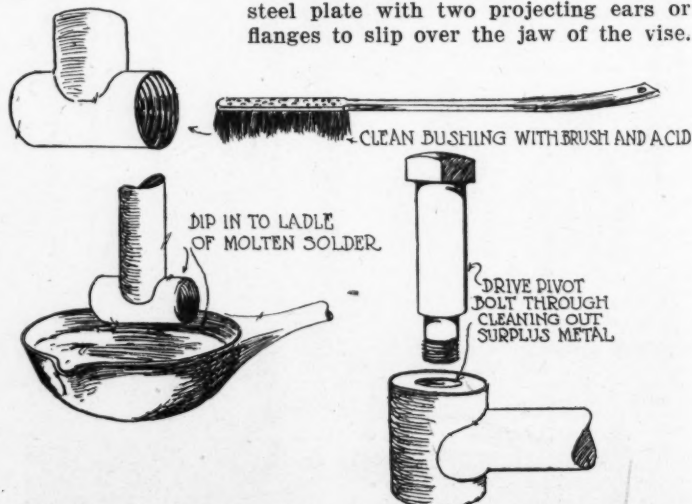
A sliding gate will serve to economize space. The pipes forming the gate move back in the pipes forming the fence

### Bench Drill Used with Vise Feed

The drilling of holes in hard metal is a tiresome task especially if the hole is to be drilled deep. A simple rigging, as is shown, will enable as much pressure to be applied to the drill as is desired, without tiring out the back or blistering the hands. This consists of a piece of steel plate with two projecting ears or flanges to slip over the jaw of the vise.



Utilizing the vise to relieve the operator of the tiresome job of applying pressure to the drill when boring hard metal



Tinning bushings to remove play. A bushing treated in this way will often serve as well as a babbitted bearing



# PISTON RING SIZES

of Cars From 1916 to 1920

Motor Age Maintenance Data Sheet No. 99

One of a series of weekly pages of information valuable to service men and dealers—save this page

## PISTON RING SIZES—1916 CARS

Car and Model	Rings per Piston	Ring Diameter	Ring Width
Allen, 37	3	3 3/4	1/4
Anderson	2	3 1/4	3/16
Apperson, 6-16	3	3 1/2	1/4-3/16
Apperson, 6-60	3	4 1/4	1/4
Apperson, 8-16	3	3 1/8	1/4-3/16
Arbenz	3	3 1/4	3/16
Argo	2	3 1/8	3/16
Auburn, 6-38, 1st	3	3 2	5/32
Auburn, 6-38, 2nd	3	3 1/8	5/32
Auburn, 6-40A	3	3 1/2	3/16
Auburn, 4-38	3	3 7/8	3/16
Austin, 48	3	4 1/2	3/16
Austin, 36	3	3 7/8	3/16
Biddle, D.	3	3 3/4	3/16
Bour-Davis, 17	3	3 1/4	3/16
Brewster, 41	4	4	1/4
Briscoe, 4-38	2	3 7/16	3/16
Briscoe, 8-38	3	3	3/16
Buick	3	3 3/4	3/16
Cadillac, 53	3	3 1/8	3/16
Cameron	3	3	3/16
Case, T.	3	3 5/8	3/16
Chalmers, 32	3	3 1/8	1/8
Chandler, 17	3	3 3/8	3/16
Chevrolet	3	3 11/16	3/16
Cole, 860	4	3 1/2	3/16
Crow-Elkhart, 30	3	3 1/2	3/16
Cunningham, V-1	3	3 3/4	3/16
Daniels	3	3	3/16
Davis, 6 F & G	3	3 1/4	3/16
Davis, 6E	3	3 1/2	3/16
Dispatch	3	3 3/4	9/32
Dodge Brothers	3	3 7/8	3/16
Dorris	3	4	1/4
Dort, 5A	3	3 1/4	3/16
Elcar, A & B	3	3 1/2	3/16
Empire, 40, 45 & 50	3	3 7/8	3/16
Empire, 60 & 70	3	3 1/4	5/32
Enger	3	2 11/16	3/16
Ford, T.	3	3 6	1/4
Franklin, Series 9	3	3 1/4	11/64
Glide, 6-40	3	3	5/32
Grant, V	3	3	3/16
Harvard	3	3	3/16
Haynes, 34-35	3	3 1/2	3/16
Herff-Brooks	3	4	1/4
Hollier, 186	3	3	3/16
Hollier, 168	4	3	3/16
Hudson, 40	3	3 1/2	3/16
Hupmobile, N	3	3 3/4	3/16
Inter-State	3	3 1/2	3/16
Jeffery, 661	3	3 1/2	3/16
Jeffery, 462-472	4	3 3/4	1/4
Jordan, B	3	3 1/2	3/16
King, E	2	3	3/16
Kissel, 6-42	2	3 5/8	3/16
Kissel, 4-32	2	3 7/8	3/16
Klinekar, 6-36-E	2	3 1/4	1/4
Lexington, 6-N	2	3 1/2	3/16
Liberty, 10-A	3	3 1/8	3/16
Locomobile, R	5	4 1/4	1/4
Locomobile, M	5	4 1/2	1/4
Lozier, 82	3	3 7/8	1/4
Madison	2	3	5/32
Marmon, 34	3	3 3/4	3/16
Maxwell, 25	3	3 5/8	3/16
McFarlan, X	3	4 1/2	3/16
Mercer, 22-72	3	3 3/4	3/16
Metz, 25	3	3 7/8	3/16
Mitchell, C	3	3 1/2	1/4
Moline-Knight, C	3	3 3/4	3/16
Moline-Knight, G	3	4	1/4
Monitor, C	3	3 3/4	3/16
Monitor, M	3	3 1/4	3/16
Monroe, M-2	3	3 11/16	3/16
Moon, 6-30	3	3 1/4	1/4-3/16
Moon, 6-66	3	3 1/2	3/16
Moore	3	3 25/32	3/16
National, A C	3	3 1/2	3/16
National, A D	4	2 3/4	7/32
Oakland, 38 & 50	3	3 1/2	3/16
Oakland, 32	4	2 13/16	3/16
Oldsmobile, 43	4	3 1/2	1/4
Oldsmobile, 44	4	2 7/8	3/16
Overland, 83 & 84	2	4 1/8	3/8
Overland, 86	3	3 1/2	3/16
Overland, 75	4	3 9/64	3/16
Overland, 75B	4	3 3/8	3/16
Owen Magnetic, C-36	3	3 3/4	3/16
Packard, 125 & 135	3	3	3/16
Paige, 6-38	3	3 1/8	5/32
Paterson, 6-42	3	3 1/4	3/16
Pathfinder	3	2 7/8	3/16

Car and Model	Rings per Piston	Ring Diameter	Ring Width
Peerless, 56, Series 1	3	3 1/4	3/16
Phianna, M	3	3 29/32	5/16
Pierce-Arrow, 38-C4	3	4	1/4
Pierce-Arrow, 48-B4	3	4 1/2	1/4
Pierce-Arrow, 66-A4	3	5	9/32
Pilot, 6-45	3	3 1/8	3/16
Premier, 6-51	4	4	3/16
Pullman	3	3 3/4	3/16
Regal, J	3	3 1/8	5/32
Regal, E	3	3 3/8	3/16
Regal, ER	3	3 1/2	3/8
Reo, R & S	3	4 1/8	3/8
Reo, M & N	3	3 9/16	3/8
Roamer, 6-54	3	3 1/2	3/16
Richmond	3	4	1/4
Ross	3	3 1/4	3/16
Saxon	4	4 3/8	7/32
Simplex	4	4	3/16
Singer, 16	4	4	3/16
Standard, E	3	3	3/16
Stearns, SKL4	4	3 3/4	3/8
Stearns, SK8	2	3 1/4	3/8
Stephens, 60	2	3 1/4	1/4
Studebaker, All	4	3 7/8	5/32
Stutz, C	3	4 3/4	1/4
Sun	3	3 1/8	3/16
Trumbull	3	2 7/8	5/32
Vellie, 27	3	3 1/2	3/16
Vellie, 28	3	3 1/4	3/16
Westcott, M-41	3	3 1/4	3/16
Westcott, M-42 & 51	3	3 1/2	3/16
White	3	3 3/4	3/16
Winton, 22	3	4 1/2	1/4
Winton, 22-A	3	3 3/4	1/4

## PISTON RING SIZES—1917 CARS

Car and Model	Rings per Piston	Ring Diameter	Ring Width
Abbott, 6-44	3	3 3/4	1/4
Allen, 37	3	3 3/4	1/4
American, A	3	3	3/16
Anderson	2	3 1/4	3/16
Apperson, 6-17	3	3 1/2	3/16
Apperson, 8-17	3	3 1/4	3/16
Arbenz	3	3 1/4	3/16
Auburn, 6-39, 1st	3	3 1/8	5/32
Auburn, 6-39, 2nd	4	3 1/8	3/16
Auburn, 6-39, Late	3	3 1/4	3/16
Auburn, 6-44	3	3 1/2	3/16
Austin Hi-hwy King	3	2 7/8	3/16
Bell	3	3 1/2	1/4
Biddle, D	3	3 3/4	3/16
Bour-Davis, 17-B	3	3 1/2	3/16
Brewster	3	3 1/8	3/16
Briscoe, 4-24	3	3 3/8	3/16
Buick, D34-35	3	3 3/4	3/16
Buick, D44-45-46-49	3	3 3/4	3/16
Cadillac, 55	3	3 1/8	3/16
Cameron	3	3	3/16
Case, T	3	3 5/8	3/16
Chalmers, 6-30	3	3 1/4	3/16
Chandler, 17	3	3 1/2	3/16
Chevrolet, 490 & F	3	3 11/16	3/16
Chevrolet, D	3	3 3/8	3/16
Cole, 860	4	3 1/2	3/16
Commonwealth, 4-40	3	3 1/2	3/16
Crow-Elkhart, All	3	3 1/2	3/16
Cunningham, V-2	3	3 3/4	3/16
Daniels	3	3 1/4	3/16
Davis, 6H, I & K	3	3 1/2	3/16
Davis, 6J	3	3 1/2	3/16
Detroit, 6-45	3	3 1/4	3/16
Dispatch	3	3 3/4	9/32
Dixie Flyer, L-S35	3	3 1/4	3/16
Dodge Brothers	3	3 7/8	3/16
Dorris, IC6	3	4	1/4
Dort, 9	3	3 1/4	3/16
Drexel	3	3 1/2	3/16
Drummond	3	3	1/4
Elcar, D, E & F	3	3 1/2	3/16
Elgin, F	3	3	3/16
Emerson	3	3 3/4	3/16
Empire, 40, 45 & 50	3	3 7/8	3/16
Empire, 60 & 70	3	3 1/4	3/16
Enger	3	2 11/16	3/16
Ford, T	3	3 610	1/4
Franklin, Series 9	3	3 1/4	11/64
F. R. P., 45 A & B	2	4 600	1/4
Geneva	3	5 1/8	9/32
Geronimo, 4-A-40	3	3 1/2	3/16
Glide, 6-40	3	3 1/8	5/32
Grant, K	3	3	3/16
Hackett	3	3 3/4	3/16

Car and Model	Rings per Piston	Ring Diameter	Ring Width
Hal, 21	3	2 7/8	3/16
Harroun	3	3 1/4	1/4
Harvard	3	3	3/16
Hatfield	3	3 3/4	3/16
Haynes, 36 & 37	3	3 1/2	3/16
Haynes, 40-41	4	2 3/4	3/16
Hollier, 178	2	3	3/16
Hudson	3	3 1/2	3/16
Hupmobile, N	2	3 3/4	3/16
Inter-State, All	3	3 1/2	3/16
Jackson	3	3 1/2	3/16
Jeffery, 671	4	3 1/2	3/16
Jones, 26	3	3 1/2	3/16
Jordan, B	3	3 1/2	3/16
King, EE & F	2	3	3/16
Kissel, 100 Pt. Six	2	3 1/4	1/4
Kissel, 100 Pt. Six	3	3 1/4	3/16
Kissel, 6-42	2	3 5/8	1/4
Kissel, 4-32	2	4 1/4	1/4
Kissel, 4-36	2	3 7/8	1/4
Klinekar, 6-38-F	3	3 1/4	1/4
Lambert, 80	3	3 1/4	1/4
Lambert, 90	3	4 1/8	1/4
Laurel	3	3 3/4	3/16
Lexington, 6-0	3	3 1/4	3/16
Liberty, 10-B	3	3 1/4	3/16
Locomobile, R	3	4 1/4	1/4
Locomobile, M	3	4 1/2	1/4
Lozier, 82	3	3 7/8	1/4
Lozier, 92	4	3 7/8	3/16
Luverne	3	3 3/4	3/16
Madison	3	3 1/8	5/32
Malbohm, A	2	3 1/8	3/16
Marmon, 34	3	3 3/4	3/16
Maxwell, 25	3	3 5/8	3/16
McFarlan, X	4	4 1/2	1/4
Mercer, 22-73	3	3 3/4	3/16
Metz, 25	3	3 7/8	3/16
Mitchell, C	3	3 1/2	1/4
Mitchell, D	3	3 1/4	3/16
Moline-Knight, C	3	3 3/4	3/16
Moline-Knight, G	3	4	1/4
Monitor, C	3	3 3/4	3/16
Monitor, M	3	3 1/4	3/16
Monroe, M	3	3 1/4	3/16
Moon, 6-43	3	3 1/4	3/16
Moon, 6-66	3	3 1/2	3/16
Moore	3	3 25/32	3/16
Murray	3	3 1/4	3/16
National, A E	3	3 1/2	3/16
National, A H	4	2 3/4	7/32
Nelson	2	3 1/8	3/16
Oakland, 34	3	2 13/16	3/16
Oldsmobile, 37	3	2 13/16	3/16
Oldsmobile, 45	4	2 7/8	3/16
Overland, 90	3	3 1/2	3/16
Owen-Magnetic, M-25	3	3 1/2	3/16
Owen-Magnetic, O-36	3	3 3/4	3/16
Packard, 225 & 235	4	3	3/16
Paige, 6-51	3	3 1/2	3/16
Paige, 6-39	3	3 1/8	5/32
Paterson, 6-45	3	3 1/4	3/16
Pathfinder	3	2 7/8	3/16
Peerless, 56, S. 2-3	3	3 1/4	3/16
Phianna, M	3	3 29/32	5/16
Piedmont, 4-30	3	3 1/2	3/16
Piedmont, 6-40	2	3 1/4	1/4
Pierce-Arrow, 38-C-4	3	4	1/4
Pierce-Arrow, 48-B-4 & 5	3	4 1/2	1/4
Pierce-Arrow, 66-A-4	3	5	9/32
Pilot, 6-45	3	3 1/8	3/16
Premier, 6-B	3	3 3/8	3/16
Princess, 4-36-F	3	3 3/4	3/16
Pullman	3	3 3/4	3/16
Regal, F	3	3	3/16
Regal, J	3	3 1/8	5/32
Reo, R & S	3	4 1/8	3/8
Reo, M & N	3	3 9/16	3/16
Richmond	3	4	1/4
Roamer, 6-54	3	3 1/2	3/16
Ross	3	3 1/4	3/16
Sayers, A	3	3 1/4	3/16
Scripps-Booth, D	3	3	3/16
Seneca, A	3	3 1/8	3/16
Simplex	4	4 3/8	7/32
Singer, 17	4	4	3/16
Standard, F	3	3 1/4	3/16
Stearns, SKL4	3	3 3/4	3/16
Stearns, SK8	3	3 1/4	3/16
Stephens, 60	3	3 1/4	1/4
Stephens, 70	3	3 1/4	3/16
Studebaker, All	4	3 7/8	5/32
Stutz, R	3	4 3/4	1/4

(To be continued next week)

# Law in Your Business



By Wellington Gustin

## The Validity of Certain Motor Vehicle Laws

### MOTOR BUS ENGAGED IN INTER-STATE COMMERCE NOT SUBJECT TO LOCAL LICENSE

In view of the rising demand for motor transportation and the many resulting requirements made on those who enter into such work, it will be well to consider a recent Massachusetts case involving the proposition from the angle of license tax. The city of Pittsfield, Mass., complained against defendant for driving and using an automobile for the conveyance of persons for hire without a license, contrary to the terms of an ordinance of the city. This ordinance prohibits any person from using an automobile to transport people from place to place within the city without a license.

The facts showed that defendant operated a motor vehicle, making a daily trip from Albany, N. Y., to Pittsfield, Mass., and return, carrying passengers for hire accepted only for the entire trip across the state line in either direction. He had no such license as the ordinance required. He was prosecuted and convicted under the ordinance, but appealed his case to the Supreme Judicial Court of Massachusetts on the ground that he was engaged in interstate commerce and hence the ordinance could not apply to him. The court held defendant to be engaged exclusively in interstate commerce as this has been held by the United States Supreme Court to include the transportation of persons and property, no less than the purchase, sale and exchange of commodities. *United States vs. Hill*, 39 Sup. Ct. 143. The Supreme Court has said: "A state law is unconstitutional and void which requires a party to take out a license for carrying on interstate commerce, no matter how specious the pretext may be for imposing it."

But on the other hand, there are a large group of laws, general in their operation and affecting interstate commerce only incidentally, which are not unconstitutional. These the motor owners must look out for. An attack was made upon the motor vehicle law of Maryland in the U. S. Supreme Court, as being unconstitutional. The statute was general in scope and applied alike to all owners and users of motor vehicles. It required registra-

**S**EEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. *MOTOR AGE* presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted him.

tion and a fee roughly proportioned to the horse power of the car. No person was permitted to drive a car unless licensed after payment of a fee. Other sections of the law related to speed, the law of the road, accidents, signals and kindred matters. The fees were for revenue and not merely to cover inspection charges. In upholding this law the court said: "In the absence of national legislation covering the subject, a state may rightfully prescribe uniform regulations necessary for public safety and order in respect to operation, upon its highways of all motor vehicles—those moving in interstate commerce as well as others. And to this end it may require the registration of such vehicles and the licensing of their drivers, charging therefor reasonable fees graduated according to the horsepower of the engines—a practical measure of size, speed and difficulty of control. This is but an exercise of the police power uniformly recognized as belonging to the states and essential to the preservation of the health, safety and comfort of their citizens; and it does not constitute a direct and material burden on interstate commerce."

### NEW JERSEY MOTOR VEHICLE LAW

Again, the U. S. Supreme Court has held as being constitutional a New Jersey statute requiring, in addition to general license and registration and fee, the appointment of a resident agent by non-resident owners of automobiles. The reason for sustaining the validity of such laws was stated by the court to be that they imposed "license fees upon motor vehicles, graduated according to horse power, so as to secure compensation for the use of improved roadways from a class of users for whose needs they are essential and



whose operations over them are peculiarly injurious."

## Is Father Responsible For Debts of Minor Child?

I sold a car to two brothers on time, with a payment down and the balance in monthly notes. They made about three payments on the car, then brought it to the garage and left it, owing the balance and a repair bill. One of the boys was under age, but we took his word for it. The car has been in our garage and they have never said anything about it. The other boy signed his half-interest over to us and when we asked the father to sign the youngest boy's part over he refused to do it. Is he not responsible for this boy's debts?

Then again, the father is in the hauling business, and we owe him a bill for delivering freight and express to us, which we have refused to pay because we feel that he owes us.

Are we justified in doing this? Both these boys have left town and would we have a right to claim this car without foreclosing the mortgage? We would certainly appreciate any information you may be able to give us.—W. S. Williams, Southern Motor Co., London, Ky.

The father is not responsible for the debts of his minor child, except for necessities which the father has failed, or refused, to furnish.

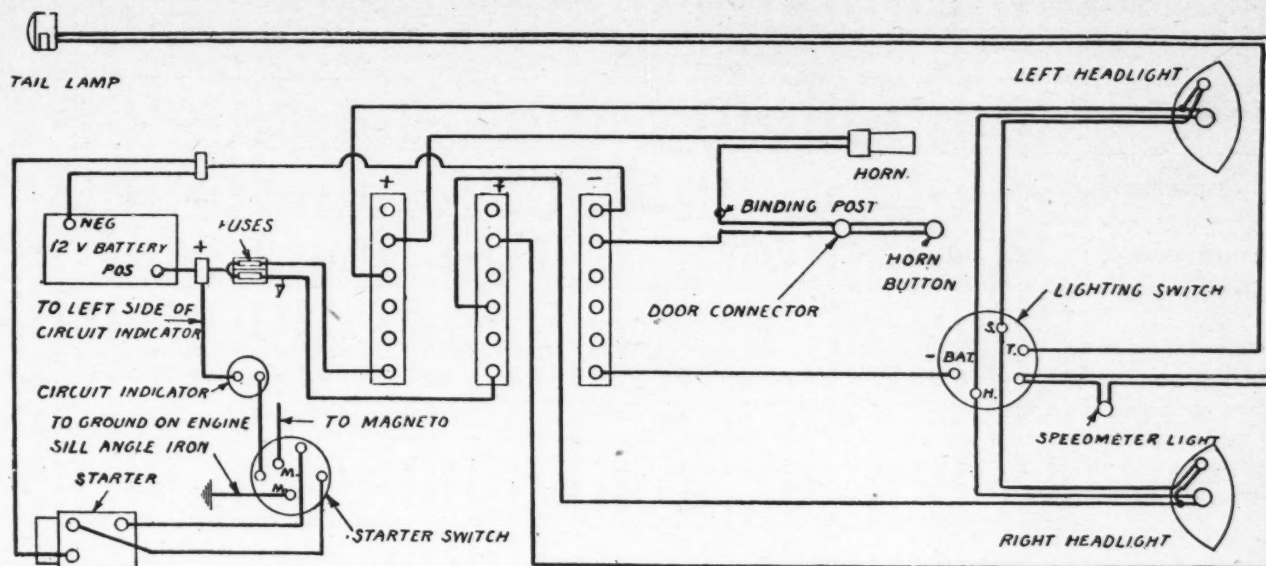
You are not justified in law in refusing to pay the father for hauling for you, because he refuses to sign the boy's interest to you. Without authority from the son, the father would have no right to sign over the boy's interest in the car. It might happen that such a course as you have pursued would secure for you the desired results, but you are courting a lawsuit unfavorable to you in refusing payment if the father desired to collect for his freight by entering suit.

As a practical proposition, it might be that should you claim the car and sell it, the minor brother would never attempt to assert any claim, he being in an unfavorable position. But the safe way would be to foreclose the mortgage, for then the boy's interest would be determined once and for all. Besides this is the proper way to get full and complete title to the car. A minor may avoid his contracts in many cases, and no doubt may avoid his mortgage contract. He may recover money paid under such contract.

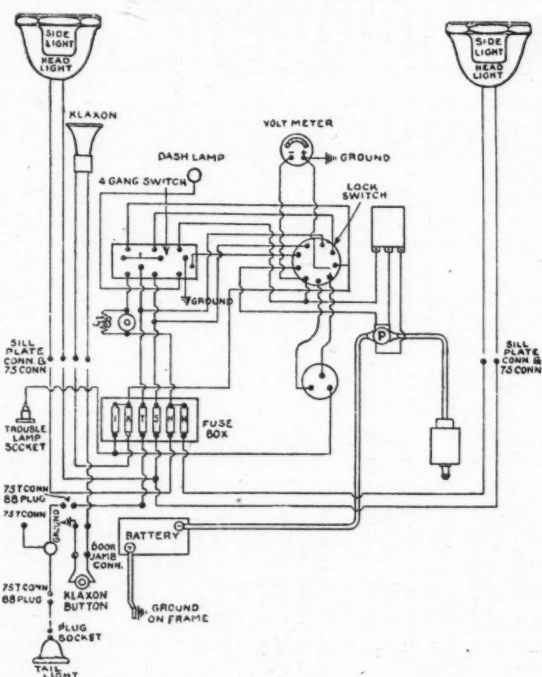
It would be best to present the facts to a court, by foreclosure and have the cause justly determined, and thus secure a complete title. Otherwise, the youth may at some time in the future cause you trouble by bring various actions to harass you.



# Motor Age Weekly Wiring Chart No. 80

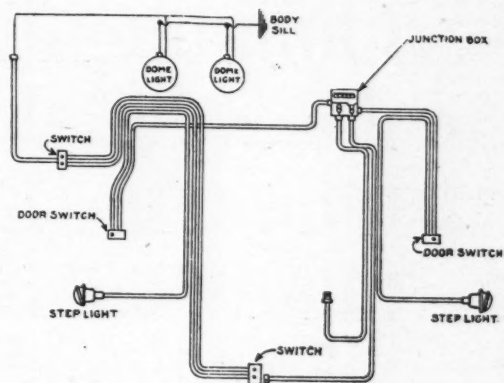


1919 Franklin



1919 Franklin

Locomobile 6-38, 6-48



Locomobile 6-38, 6-48

- Allen—Dec. 18, '19  
Auburn—Nov. 27, '19; April 1, '20  
Briscoe—May 6, '20  
Cadillac—April 22, '20  
Chalmers—Nov. 27, '19  
Chandler—May 20, '20  
Crow-Elkhart—April 22, '20  
Cutting—Nov. 6, '19  
Daniels—Dec. 4, '19  
Davis—Dec. 4, '19  
Dixie—April 1, '20  
Dodge—April 15, '20  
Dorris—Dec. 11, '19  
Dort—March 25, '20  
Elear—May 6, '20

- Franklin—Dec. 11, '19  
General Battery Charging—Sept. 15, '19  
General Magneto Diagram—June 5, '19  
Grant—April 29, '20  
Hupmobile—May 27, '20  
Internal Connections—July 10-17-24, '19  
Jeffery—May 13, '20  
Keeton—Nov. 6, '19  
King—May 20, '20  
Kissel—May 27, '20  
Lexington—Jan. 1, '20  
Liberty—Jan. 1, '20  
Marmon—Dec. 25, '19; Jan. 22, '20  
Mercer—Nov. 27, '19; March 25, '20  
Mitchell—Jan. 8, '20  
Moline-Knight—May 20, '20  
Moon—Jan. 29, '20; March 11, '20  
Moore—March 4, '20  
Nash—March 11, '20  
National—Feb. 12, '20  
Oakland—April 15, '20

- Oldsmobile—April 8, '20  
Olympian—Jan. 22, '20  
Packard—March 18, '20  
Paige—July 3, '19; April 20, '20  
Peerless—May 13, '20  
Pierce-Arrow—Feb. 5, '20  
Pilot—March 4, '20  
Premier—Dec. 18, '19; Feb. 26, '20  
Reo—Nov. 13, '19  
Roamer—March 18, '20  
Saxon—April 8, '20  
Scripps-Booth—Jan. 15, '20  
Stearns-Knight—Jan. 8, '20  
Stephens—Feb. 12, '20  
Studebaker—Dec. 25, '19  
Stutz—Feb. 5, '20  
Templar—Jan. 20, '20  
Vellie—Feb. 19, '20  
Westcott—Jan. 15, '20  
White—Feb. 19, '20  
Willys-Knight—Feb. 26, '20  
Special Systems for Fords—May 15-22, '19

These prices apply to five and seven-passenger models only.

Name and Model	Seating Capacity	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. HP.	Gear Ratio	Clutch	Clearcut	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Ace T. L.	5	2050 115	32x4	Firestone	31x5	H-S	6	25 35 11	4.50	Detlaiff	Warner	Detroit	Spaacke	Gemmer	Stewart	Firestone	6	170	U. S. L.	A-L	G. & D.	A-K	6	Ace T. L.
American C	7	2350 127	32x4	Firestone	31x5	H-S	6	25 35 11	4.90	B. and B.	Detroit	Acme	Salisbury	Standard	Warner	Firestone	6	110	Willard	G. & D.	G. & D.	Conn.	6	American C
American Beauty	5	2450 121	33x4	Goodrich	31x5	H-S	6	25 35 11	4.50	B. and B.	Durston	Ther-H	Salisbury	Jacox	Stewart	Firestone	6	90	Willard	West.	West.	A-K	6	American Beauty
Anderson Series 30	7	120 120	33x4	U. S.	31x5	Own	8	33 80 11	4.25	Own	Own	Sterling	Own	Own	V. Sicklen	Firestone	6	110	Willard	Bijur	Remy	Remy	6	Anderson Series 30
Apperson Anniversary	7	3500 130	34x4	Goodyear	31x5	Own	8	33 80 11	4.25	Own	Own	Opt.	Stan-Par	Gemmer	Waltham	Firestone	12	115	Willard	Bijur	Remy	Remy	6	Apperson Anniversary
Apperson 8-20	7	4750 128	32x4	Goodrich	31x5	Own	8	33 80 11	4.25	Own	G-L	Hartford	Col.	Jacox	Stewart	Firestone	12	115	Willard	West.	West.	Eise.	12	Apperson 8-20
Argonne	4	1895 120	33x4	Goodrich	31x5	Own	6	25 35 1	4.66	B. and B.	Detroit	Arvac.	Stan-Par	Ditweiler	Stewart	Firestone	6	80	Willard	Remy	Remy	Remy	6	Argonne
Auburn 6-39	5	2150 120	33x4	Goodrich	31x5	Cont.	6	25 35 1	4.66	B. and B.	Muncie	Hart	Peru	Warner	Stewart	Firestone	6	100	Exide	A-L	A-L	Conn.	6	Auburn 6-39
Beggs 6	5	1495 114	31x4	Miller	31x4	C. B. & S.	4	22 50 1	4.50	Warner	Warner	Spicer	Stan-Par	Gemmer	Stewart	Firestone	6	90	Phila.	G. & D.	G. & D.	A-K	6	Beggs 6
Bell	5	1800 118	32x4	Goodyear	31x4	Cont.	6	25 35 1	4.75	B. and B.	Detroit	Mechanics	Salisbury	C. A. S.	Stewart	Firestone	6	115	Willard	Remy	Remy	Simms	6	Bell
Biddle B-5	7	2875 126	33x4	Goodyear	31x5	Cont.	4	25 60 11	4.50	Muncie	Muncie	Spicer	Salisbury	C. A. S.	Stewart	Firestone	6	115	Willard	West.	West.	Simms	6	Biddle B-5
Bour Davis 20	7	9000 125	34x4	Kelly-S	4x5	Own	4	25 60 11	4.50	Own	Own	Spicer	Salisbury	Lavine	Stewart	Firestone	12	80	U. S. L.	U. S. L.	U. S. L.	West.	6	Bour Davis 20
Bour-Davis 21 S. & R.	5	1185 109	31x4	optional	31x5	Own	4	18 23 1	4.18	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	Willard	U. S. L.	U. S. L.	U. S. L.	6	Bour-Davis 21 S. & R.
Brewster	5	1395 118	33x4	Goodyear	31x4	Own	6	27 34	4.00	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Brewster
Briscoe 4-34	7	1865 114	34x4	Goodyear	31x4	Own	8	31 25 11	5.08	Own	Own	Spicer	C-Tink.	Own	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Briscoe 4-34
Buick K-6-45	7	3740 132	35x5	optional	31x5	Own	8	31 25 11	5.08	Own	Own	Spicer	C-Tink.	Own	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Buick K-6-45
Buick K-6-49	7	2650 126	34x4	Goodyear	31x5	Own	6	29 40 11	4.45	B. and B.	G-L	Peters	Col.	Jacox	V. Sicklen	Firestone	6	118	Willard	West.	West.	Delco	6	Buick K-6-49
Cadillac 59	7	1945 117	32x4	Goodyear	31x4	Own	6	25 35	4.45	Own	Own	Own	Col.	Own	V. Sicklen	Firestone	6	106	Willard	West.	West.	Delco	6	Cadillac 59
Case V	5	2095 122	33x4	optional	31x4	Own	6	25 35	4.25	B. and B.	G-L	Own	Peru	Own	Stewart	Firestone	6	106	Willard	Delco	Delco	Delco	6	Case V
Chalmers 35-C	5	1250 116	32x3	Goodrich	31x5	Lyco	4	19 60 1	4.25	B. and B.	G-L	Own	Peru	C. A. S.	Stewart	Firestone	6	106	Willard	Delco	Delco	Delco	6	Chalmers 35-C
Chalmers 35-B	5	1395 118	32x4	Goodrich	31x5	H-S	4	19 60 1	4.25	B. and B.	G-L	Own	Peru	C. A. S.	Stewart	Firestone	6	106	Willard	Delco	Delco	Delco	6	Chalmers 35-B
Champion S-4	7	1895 123	33x4	Goodrich	31x5	Own	6	29 40 11	4.40	B. and B.	Own	Hartford	Own	C. A. S.	Stewart	Firestone	6	120	Prest.	Dyn.	Dyn.	A-K	6	Champion S-4
Chandler	5	795 102	31x4	Goodyear	31x4	Own	4	21 76 11	3.63	Own	Warner	Own	Own	Gemmer	Stewart	Firestone	6	80	Willard	G. & D.	G. & D.	Bosch	6	Chandler
Chevrolet 4-90	5	1295 110	33x4	Goodyear	31x5	Own	4	27 10 11	4.62	Own	Mechanics	Mechanics	Own	Warner	Stewart	Firestone	6	80	Willard	A-L	A-L	Simms	6	Chevrolet 4-90
Chevrolet F. B.	5	1485 112	32x4	Goodyear	31x5	Own	6	21 00 1	4.45	B. and B.	B-L	Hartford	Own	Warner	Stewart	Firestone	6	80	Willard	A-L	A-L	Simms	6	Chevrolet F. B.
Cleveland 40	5	1550 110	33x4	Goodyear	31x5	H-S	4	19 60 1	4.45	B. and B.	North	Hartford	Own	Warner	Stewart	Firestone	6	80	Willard	G. & D.	G. & D.	Bosch	6	Cleveland 40
Climber 4	5	2450 120	33x4	Goodyear	31x5	Cont.	6	25 35 11	4.75	B. and B.	Durston	Spicer	Col.	Gemmer	Stewart	Firestone	6	50	Prest.	West.	West.	A-K	6	Climber 4
Cole Aero Eight 870	7	2850 127	33x5	Goodyear	31x5	North.	8	39 30 11	4.45	North.	Spicer	Spicer	Col.	Gemmer	Stewart	Firestone	6	120	Willard	West.	West.	A-K	6	Cole Aero Eight 870
Columbia C	5	1895 115	32x4	Firestone	31x4	Cont.	6	25 35 11	4.75	B. and B.	Durston	Spicer	Col.	Gemmer	Stewart	Firestone	6	105	Prest.	Delco	Delco	Delco	6	Columbia C
Comet C-53	5	2350 125	32x4	Firestone	31x5	Lyco	6	29 40 11	4.66	B. and B.	Muncie	Arvac	Col.	Gemmer	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Wagner	6	Comet C-53
Commonwealth 4-40	5	1495 117	32x4	Goodrich	31x5	Cont.	6	29 40 11	4.25	B. and B.	G-L	Detroit	Peru	C. A. S.	Stewart	Firestone	6	105	Prest.	West.	West.	A-K	6	Commonwealth 4-40
Crawford 20-40	7	3095 117	32x3	Firestone	31x5	Lyco	6	29 40 11	4.25	B. and B.	Covert	Ther-H	Peru	Gemmer	Stewart	Firestone	6	80	Exide	West.	West.	Bosch	6	Crawford 20-40
Crow-Elkhart L-55-6	5	1645 117	33x4	Firestone	31x5	Ruten.	6	23 4	4.25	B. and B.	Covert	Ther-H	Peru	Ditweiler	Stewart	Firestone	6	80	Exide	Dyn.	Dyn.	Conn.	6	Crow-Elkhart L-55-6
Cunningham V-4	7	142 355	33x4	optional	31x5	Own	8	45 00 11	4.08	B-L	Own	Snead	Timken	Gemmer	Stewart	Firestone	6	120	Willard	Dyn.	Dyn.	Conn.	6	Cunningham V-4
Daniels D	5	4850 132	34x4	optional	31x5	Own	8	39 30 11	4.40	Own	Spicer	Spicer	Timken	Gemmer	Stewart	Firestone	6	145	Willard	Delco	Delco	Delco	6	Daniels D
Davis 51	5	1185 114	32x3	optional	31x5	Own	4	24 03 11	4.75	B. and B.	Warner	Spicer	Timken	Gemmer	Stewart	Firestone	6	80	Willard	Delco	Delco	Delco	6	Davis 51
Dodge Brothers	5	4350 132	33x5	Goodyear	31x5	Own	4	24 03 11	4.16	Own	G-L	Ther H	Peru	C. A. S.	Stewart	Firestone	6	80	Willard	Dyn.	Dyn.	Eise.	6	Dodge Brothers
Doris 6-80	5	1035 105	30x3	Goodyear	31x5	Own	4	35 40 11	3.50	Warner	Warner	Mechanics	Timken	Ross	J. Man.	Standard	12	50	Willard	N. E.	West.	West.	12	Doris 6-80
Dort 15	5	1585 112	32x3	Goodyear	31x5	Cont.	4	19 60 1	4.07	Own	Muncie	Spicer	Flint	V. Sicklen	Stewart	Firestone	6	130	Willard	West.	West.	Bosch	6	Dort 15
du Pont A	5	4000 124	32x4	Goodyear	31x5	Cont.	4	24 75	4.45	B-L	B-L	Spicer	Col.	Jacox	Stewart	Firestone	6	95	U. S. L.	West.	West.	Conn.	6	du Pont A
Economy 6-46	5	1895 115	33x4	Goodrich	31x4	Cont.	6	25 35 1	4.50	B. and B.	Durston	Spicer	Salisbury	C. A. S.	Stewart	Firestone	6	105	Exide	West.	West.	Eise.	6	Economy 6-46
Clear 6	5	1705 116	33x4	Firestone	31x4	Cont.	6	25 35 11	4.50	B. and B.	Muncie	Peters	Salisbury	C. A. S.	Stewart	Firestone	6	90	Willard	A-L	A-L	Conn.	6	Clear 6
Clear 4	5	1495 116	33x4	Firestone	31x5	Lyco	4	19 60 1	4.50	B. and B.	Muncie	Peters	Salisbury	C. A. S.	Stewart	Firestone	6	90	Willard	Delco	Delco	Delco	6	Clear 4

Engines—Ruten,	Rutenberg; Cont.,	Continental; Weid.,	Weidely; North.,	Northway; H-S.,	Herschell-Spillman; Lyco.,	Lycoming; D-Lyco.,	Dort-Lycoming; G. B. & S.,	Golden, Belknap & Swartz;	T-McTeeter-McFarlan; #,	Monson or Duesenberg; R. & V.,	Root & Van Dervoort.	Carburetor—Strom.,	Stromberg; Zen.,	Zenith; Ray.,	Rayfield; John.,	Johnson; Mar.,	Marvel; Sund.,	Sunderman; Stew. Stewart; H-K.,	Holley-Kingston; Newen, Newcomb; Scheb.,	Schobler; Tillot.,	Tillotson; Johns.,	Johnston.	Fuel feed vacuum except where otherwise indicated.	#Pressure.	#Gravity.	Generator and Motor—A-L.,	Auto-Lite; West.,	Westinghouse or Auto-Lite; W-E.,	North-East; L-N.,	Leese-Neville; A-C.,	Allis-Chalmers; Split.,	Splitdorf; S-H.,	Simms-Huff; G. D.,	Gray & Davis.	Ignition—A-K.,	Aviator-Kent; Conn.,	Connecticut; Eise.,	Eisemann; West.,	Westinghouse; Will.,	Willard; N-E.,	North East; K-Remy, Kingston-Remy; Berl.,	Berling; Bosch-W.,	Bosch-Westinghouse; Split.,	Splitdorf.	Gearset—Speedometer—J-Man.,	Johns-Manville; V-Sicklen,	Van Sicken; A-C.,	Allis-Chalmers.	Universal—Hart.,	Hartford; Weston-Mott.	West-Mott, Cadillac-Timken; West-Mott, Universal—Hart.,	Hartford; Ther-H.,	Thermotest; U. M. Co.,	Universal Machine Co.
Engines—Ruten,	Rutenberg; Cont.,	Continental; Weid.,	Weidely; North.,	Northway; H-S.,	Herschell-Spillman; Lyco.,	Lycoming; D-Lyco.,	Dort-Lycoming; G. B. & S.,	Golden, Belknap & Swartz;	T-McTeeter-McFarlan; #,	Monson or Duesenberg; R. & V.,	Root & Van Dervoort.	Carburetor—Strom.,	Stromberg; Zen.,	Zenith; Ray.,	Rayfield; John.,	Johnson; Mar.,	Marvel; Sund.,	Sunderman; Stew. Stewart; H-K.,	Holley-Kingston; Newen, Newcomb; Scheb.,	Schobler; Tillot.,	Tillotson; Johns.,	Johnston.	Fuel feed vacuum except where otherwise indicated.	#Pressure.	#Gravity.	Generator and Motor—A-L.,	Auto-Lite; West.,	Westinghouse or Auto-Lite; W-E.,	North-East; L-N.,	Leese-Neville; A-C.,	Allis-Chalmers; Split.,	Splitdorf; S-H.,	Simms-Huff; G. D.,	Gray & Davis.	Ignition—A-K.,	Aviator-Kent; Conn.,	Connecticut; Eise.,	Eisemann; West.,	Westinghouse; Will.,	Willard; N-E.,	North East; K-Remy, Kingston-Remy; Berl.,	Berling; Bosch-W.,	Bosch-Westinghouse; Split.,	Splitdorf.	Gearset—Speedometer—J-Man.,	Johns-Manville; V-Sicklen,	Van Sicken; A-C.,	Allis-Chalmers.	Universal—Hart.,	Hartford; Weston-Mott.	West-Mott, Cadillac-Timken; West-Mott, Universal—Hart.,	Hartford; Ther-H.,	Thermotest; U. M. Co.,	Universal Machine Co.



Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Elgin Series K.....	5	1665 118	33x4	33x4	optional	31x4	Falls	6	23 44	1-Stron.	5.09	B. and B.	Mechanics	Mechanics	Col.	C. A. S.	V. Sicklen	Firestone	6	90	Willard	Wagner	Wagner	Wagner	6	Elgin Series K
Essex A.....	5	1795 1084	32x4	32x4	optional	31x5	Own	4	18 23	1-Stron.	5.09	Own	Own	Spicer	Timken	Gemmer	Stewart	Kelsey	6	105	Exide	Delco	Delco	Delco	6	Essex A
Fergus.....	6	126	32x4	32x4	optional	31x5	Cont.	6	25 35	1-Stron.	4.75	Own	G-L	Peters	Col.	Gemmer	Warner	Firestone	6	120	Willard	Bijur	Bijur	Delco	6	Fergus
Fiat.....	7	3390 130	32x4	32x4	Firestone	31x5	Own	6	29 40	1-Stron.	4.75	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Fiat
Ford T.....	5	575 100	30x3	30x3	Goodyear	31x4	Own	4	22 50	1-Stron.	3.63	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Ford T
Franklin 9-B.....	5	3100 115	32x4	32x4	Goodyear	31x4	Own	6	25 35	1-Stron.	4.33	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Franklin 9-B
Gardner.....	5	1195 112	32x4	32x4	Goodyear	31x5	Own	6	25 35	1-Stron.	4.33	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Gardner
Geronimo.....	5	1995 122	32x4	32x4	Goodyear	31x5	Own	6	25 35	1-Stron.	4.33	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Geronimo
Grant H-X.....	5	1595 116	32x4	32x4	Goodyear	31x5	Own	6	25 35	1-Stron.	4.33	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Grant H-X
Hanson 54-A.....	5	2165 119	32x4	32x4	optional	31x4	Walker	6	22 52	1-Stron.	4.63	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Hanson 54-A
Harroun A-2.....	5	995 106	30x3	30x3	Miller	31x4	Own	4	16 90	1-Stron.	4.00	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Harroun A-2
Harvard 4-20.....	2	850 100	28x3	28x3	Firestone	31x4	Own	4	14 40	1-Stron.	4.00	Own	Own	Own	Own	Own	Stewart	Firestone	6	80	None	Own	Own	Own	6	Harvard 4-20
Hatfield A-42.....	7	1695 115	32x4	32x4	Firestone	31x5	H-S	12	36 30	1-Stron.	4.07	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Hatfield A-42
Haynes 46.....	7	3450 127	34x4	34x4	optional	31x5	Own	6	21 03	1-Stron.	4.42	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Haynes 46
Haynes 45.....	7	2685 127	34x4	34x4	optional	31x5	Own	6	21 03	1-Stron.	4.42	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Haynes 45
H. C. S. Special.....	4	2950 120	32x4	32x4	Goodrich	31x5	Weid	6	29 40	1-Stron.	4.42	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	H. C. S. Special
Hollier 206-B.....	5	1985 120	33x4	33x4	Goodrich	31x4	Own	4	21 03	1-Stron.	4.41	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Hollier 206-B
Holmes.....	7	3350 126	34x4	34x4	Goodyear	31x4	Own	6	25 35	1-Stron.	4.41	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Holmes
Hudson O.....	7	2600 125	34x4	34x4	optional	31x5	Own	6	29 40	1-Stron.	4.45	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Hudson O
Huffman W.....	5	1895 120	32x4	32x4	Firestone	31x4	Own	6	25 35	1-Stron.	4.87	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Huffman W
Hupmobile R.....	5	1685 112	32x4	32x4	Goodyear	31x5	Own	4	16 90	1-Stron.	4.87	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Hupmobile R
Hupmobile B.....	5	121 33x4	32x4	32x4	Goodyear	31x4	Own	6	25 35	1-Stron.	4.87	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Hupmobile B
Jackson 6-38.....	5	124	33x5	33x5	Goodyear	31x4	Own	4	25 35	1-Stron.	4.87	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Jackson 6-38
Jaquet, Royal.....	5	2750 126	32x4	32x4	Goodrich	31x5	Own	4	25 35	1-Stron.	4.87	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Jaquet, Royal
Jordan F.....	7	2975 127	32x4	32x4	Goodyear	31x5	Own	6	29 40	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Jordan F
Jordan M.....	5	2650 120	32x4	32x4	Goodyear	31x4	Own	6	25 35	1-Stron.	4.08	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Jordan M
Kenworthy 6-55.....	5	3900 130	32x4	32x4	optional	31x5	Own	6	29 40	1-Stron.	4.08	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Kenworthy 6-55
King H.....	7	3175 124	32x4	32x4	Goodyear	31x5	Own	8	28 80	1-Ball	4.10	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	King H
Kinsel.....	7	2685 120	32x4	32x4	optional	31x5	Own	6	25 35	1-Stron.	4.08	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Kinsel
Klinck 6-55-J.....	5-7	2265 121	32x4	32x4	Goodyear	31x5	Own	6	25 35	1-Stron.	4.08	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Klinck 6-55-J
LaFayette.....	7	132	33x5	33x5	Firestone	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	LaFayette
Leach.....	7	4900 126	32x4	32x4	Goodyear	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Leach
Lexington S.....	5-7	2185 122	32x4	32x4	optional	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Lexington S
Liberty 10-C.....	5	1985 117	32x4	32x4	Goodyear	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Liberty 10-C
Loomobile 48.....	5	8000 142	35x5	35x5	optional	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Loomobile 48
Lorraine.....	5	1575 114	32x4	32x4	Republic	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Lorraine
Maibohm B.....	5	1595 116	32x4	32x4	Fisk	31x4	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Maibohm B
Marmon 34.....	5	5000 136	32x4	32x4	optional	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Marmon 34
Marshall K.....	5	1295 117	32x4	32x4	optional	31x5	Own	6	25 35	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Marshall K
Maxwell 25.....	5	1155 109	30x3	30x3	Firestone	31x4	Own	4	19 60	1-Stron.	3.75	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Maxwell 25
McFarland 127.....	7	5100 136	35x5	35x5	Goodrich	31x4	Own	4	21 03	1-Stron.	3.58	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	McFarland 127
Merced Series 5.....	6	4950 132	32x4	32x4	optional	31x5	Own	4	22 50	1-Ball	3.87	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Merced Series 5
Meteor K R.....	4	5000 129	32x4	32x4	optional	31x5	Own	4	25 60	1-Stron.	4.41	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Meteor K R
Metz Master 6.....	5	1895 120	32x4	32x4	Goodrich	31x5	Own	6	25 35	1-Stron.	4.41	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Metz Master 6
Mitchell F-40.....	5	1750 120	33x4	33x4	Miller	31x4	Own	6	25 35	1-Stron.	4.41	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Mitchell F-40
Monitor M. & Ser. 3.....	5	2475 121	32x4	32x4	Miller	31x4	Own	6	25 35	1-Stron.	4.41	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Monitor M. & Ser. 3
Monroe S-9.....	5	1440 115	32x4	32x4	Goodyear	31x4	Own	4	16 90	1-Stron.	4.50	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Monroe S-9
Moon 6-48.....	5	2385 122	32x4	32x4	Miller	31x4	Own	6	25 35	1-Stron.	4.66	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Moon 6-48
Moon 6-48.....	7	2950 125	32x4	32x4	Miller	31x5	Own	6	29 40	1-Stron.	4.45	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Moon 6-48
Moore 30.....	5	1175 108	30x3	30x3	Firestone	31x5	Own	4	14 40	1-Stron.	4.45	Own	Own	Own	Own	Own	Stewart	Firestone	6	120	Willard	Wagner	Wagner	Delco	6	Moore 30

Engines—Rutenber; Cont., Continental; Weid, Weidely; North, Northway; H-S, Herschell-Spillman; Lyco, Lycoming; D-Lyco, Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTector-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. Carburetor—Strom, Stromberg; Zenith, Zenith; Ray, Rayfield; John, Johnson; Mar, Marvel; Sund, Sundman; Stew, Stewart; H-K, Holley-Kingston; Newc, Newcomb; Schob, Schobler; Tillot, Tillotson; Johns, Johnston. Fuel-fed vacuum except where otherwise indicated. \*Pressure. #Gravity. Generator and Motor—A-L, Auto-Lite; West, Westinghouse; #, Westinghouse or Auto-Lite; W-L, Ward-Leonard; Dyn, Dynato; N. E., North East; L-N, Leese-Chalmers; A-C, Allis-Chalmers; Split, Splitdorf; S-H, Simms-Huff; G. & D., Gray & Davis. Ignition—A-K, Atwater-Kent; Conn., Connecticut; Eise, Eiseemann; West, Westinghouse; Will, Willard; N. E., North East; K-Remy, Kingston-Remy; Berl, Berling; Bosch-W, Bosch-Westinghouse; Split, Splitdorf. Gearset—G-L, Grant-Lees; North, Northway; B-L, Brown-Lipe. Rear Axle—Col, Columbia; W-Weiss, Walker-Weiss; C-Timk, Cadillac-Timken; West-Mott, Weston-Mott; # Universals—Hart, Hartford; Ther-H, Thermoid-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man, Johns-Manville; V-Sicklen, Van Sicklen; A-C, Allis-Chalmers.

# Motor Age Monthly Passenger Car Specification Tables

These prices apply to five and seven-passenger models only.

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor Size and Make	Gear Ratio	Clutch	Steering Gear	Speedometer	Rims	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Nash 681	5	1595	121	32x4	optional	3 1/2x5 1/2	Own	6	25-35	1 1/2-Mar.	4.50	B. and B.	Gemmer	Stewart	Firestone	6	100	Willard	Wagner	Wagner	6	Nash 681
Nash 682	7	1765	127	34x4	optional	3 1/2x5 1/2	Own	6	25-35	1 1/2-Mar.	4.50	B. and B.	Gemmer	Stewart	Firestone	6	100	Willard	Wagner	Wagner	6	Nash 682
National Sixty BB	7	3750	130	32x4	optional	3 1/2x5 1/2	Own	6	29-40	1 1/2-Ray.	4.08	B. and B.	Warner	Warner	Firestone	6	110	Prent.	West.	Delco	6	National Sixty BB
Nelson D	5	1700	104	32x4	Goodyear	3 1/2x4 1/2	Own	4	15-63	1-Zen.	4.25	B. and B.	Warner	Stewart	Kelsey	12	72	Willard	U. S. L.	Bosch	12	Nelson D
Noma 1-B	5	2000	128	32x4	Goodyear	3 1/2x4 1/2	Own	6	25-35	1 1/2-Mar.	4.45	B. and B.	Lavine	Stewart	Firestone	6	85	Prent.	Delco	Delco	6	Noma 1-B
Oakland 34-C	5	1235	115	32x4	Goodyear	3 1/2x4 1/2	Own	6	19-00	1 1/2-Mar.	4.50	B. and B.	Jacox	Stewart	Firestone	6	120	Willard	Delco	Delco	6	Oakland 34-C
Ogden 6-60	5	3250	134	32x4	Goodyear	3 1/2x5 1/2	Own	6	33-75	1 1/2-Opt.	4.58	B. and B.	Own	Warner	Firestone	6	80	Willard	Delco	Delco	6	Ogden 6-60
Oldsmobile 37-A	5	1450	112	32x4	Goodyear	3 1/2x5 1/2	Own	6	26-45	1 1/2-John.	4.91	B. and B.	West-Mott	Stewart	Firestone	6	80	Willard	Delco	Delco	6	Oldsmobile 37-A
Oldsmobile 45-B	7	2045	122	32x4	Goodyear	3 1/2x5 1/2	Own	8	18-99	1 1/2-Ball.	4.50	B. and B.	West-Mott	Stewart	Firestone	6	80	Willard	Delco	Delco	6	Oldsmobile 45-B
Olympian 45	5	1585	112	32x4	Miller	3 1/2x4 1/2	Own	4	16-90	1 1/2-Tillot.	4.50	B. and B.	Warner	Stewart	Firestone	6	80	Willard	Delco	Delco	6	Olympian 45
Olympian 45	5	985	100	30x3 1/2	Fisk	3 1/2x4 1/2	Own	4	18-23	1 1/2-Tillot.	4.50	B. and B.	Warner	Stewart	Firestone	6	80	Willard	Delco	Delco	6	Olympian 45
Owen-Magnetic W-42	7	7000	142	35x5	optional	3 1/2x5 1/2	Own	12	43-20	1 1/2-Mar.	4.36	B. and B.	Own	Warner	Firestone	24	120	Willard	Delco	Delco	24	Owen-Magnetic W-42
Packard Twin Six	7	1770	119	32x4	optional	3 1/2x5 1/2	Own	6	29-40	1 1/2-Ray.	4.33	B. and B.	Jacox	Stewart	Firestone	6	108	Willard	G. & D.	G. & D.	6	Packard Twin Six
Paige 6-42	7	2400	127	32x4	optional	3 1/2x5 1/2	Own	6	29-40	1 1/2-Ray.	4.25	B. and B.	Jacox	Stewart	Firestone	6	108	Willard	G. & D.	G. & D.	6	Paige 6-42
Paragon	7	1685	123	32x4	optional	3 1/2x5 1/2	Own	6	21-60	1 1/2-Mar.	4.50	B. and B.	Own	Stewart	Firestone	6-8	84	U. S. L.	Bijur	Bijur	6	Paragon
Paterson 6-50	7	2130	120	32x4	optional	3 1/2x5 1/2	Own	6	25-35	1 1/2-Mar.	4.50	B. and B.	Own	Stewart	Firestone	6-8	84	U. S. L.	Bijur	Bijur	6	Paterson 6-50
Peerless Series 6	7	3050	125	34x4	Goodyear	3 1/2x5 1/2	Own	8	33-80	1 1/2-Ball.	4.54	B. and B.	Gemmer	Stewart	Firestone	6	80	Willard	Delco	Delco	6	Peerless Series 6
Phaeta R	5	9500	125	32x4	U. S.	3 1/2x6	Own	4	24-70	1 1/2-Strom.	4.45	B. and B.	Own	Warner	Firestone	6	125	Willard	A-L	A-L	6	Phaeta R
Piedmont 4-30	5	1385	116	32x4	Firestone	3 1/2x5 1/2	Own	4	19-60	1 1/2-Carter	4.45	B. and B.	Peru	Stewart	Firestone	6	90	Willard	Delco	Delco	6	Piedmont 4-30
Piedmont 6-49	5	1865	122	32x4	Firestone	3 1/2x5 1/2	Own	4	25-35	1 1/2-Strom.	4.45	B. and B.	Peru	Stewart	Firestone	6	90	Willard	Delco	Delco	6	Piedmont 6-49
Pierce-Arrow 38	7	7250	134	34x4	Goodyear	4 1/2x5 1/2	Own	6	38-40	1 1/2-Ray.	3.78	B. and B.	Warner	Stewart	Firestone	6-8	135	Willard	Delco	Delco	6	Pierce-Arrow 38
Pierce-Arrow 48	7	7750	142	35x5	Goodyear	4 1/2x5 1/2	Own	6	38-40	1 1/2-Ray.	3.78	B. and B.	Warner	Stewart	Firestone	6-8	135	Willard	Delco	Delco	6	Pierce-Arrow 48
Pilot 6-45	5	1895	120	32x4	Miller	3 1/2x5 1/2	Own	6	23-44	1 1/2-Ray.	4.90	B. and B.	Own	Stewart	Firestone	6-8	135	Willard	Delco	Delco	6	Pilot 6-45
Porter 46	7	9400	142	35x5	U. S.	3 1/2x5 1/2	Own	6	23-44	1 1/2-Ray.	4.90	B. and B.	Own	Stewart	Firestone	6-8	135	Willard	Delco	Delco	6	Porter 46
Premier 6-D	7	4600	126 1/2	32x4	Firestone	3 1/2x5 1/2	Own	6	27-34	1 1/2-Ray.	4.50	B. and B.	Own	Stewart	Firestone	12	118	Prent.	Delco	Delco	12	Premier 6-D
Reo T-6	7	1750	120	32x4	U. S.	3 1/2x5 1/2	Own	6	24-30	1 1/2-Ray.	4.66	B. and B.	Own	Stewart	Firestone	6	120	Willard	Delco	Delco	6	Reo T-6
Roamer C-6-54	7	6550	131	32x4	optional	4 1/2x6	Own	6	29-40	1 1/2-Strom.	3.44	B. and B.	Own	Stewart	Firestone	6	115	Willard	Delco	Delco	6	Roamer C-6-54
R & V Knight J	7	3075	128	32x4	Goodyear	3 1/2x5 1/2	Own	6	29-40	1 1/2-Strom.	4.90	B. and B.	Jacox	Stewart	Firestone	6	117	Willard	Wagner	Wagner	6	R & V Knight J
R & V Knight R	7	3350	127	32x4	optional	3 1/2x5 1/2	Own	6	22-50	1 1/2-Strom.	4.75	B. and B.	Jacox	Stewart	Firestone	6	117	Willard	Wagner	Wagner	6	R & V Knight R
Saxon	5	2150	115	32x4	optional	3 1/2x5 1/2	Own	4	18-23	1 1/2-Strom.	4.75	B. and B.	Own	Stewart	Firestone	6	80	Prent.	Delco	Delco	6	Saxon
Sayers Six	5	2095	118	32x4	Goodyear	3 1/2x4 1/2	Own	6	25-35	1 1/2-Strom.	4.50	B. and B.	Own	Stewart	Firestone	6	80	Prent.	Delco	Delco	6	Sayers Six
Scrimps-Booth B-39	5	1425	115	32x4	Goodyear	3 1/2x4 1/2	Own	6	18-99	1 1/2-Mar.	4.50	B. and B.	Warner	Stewart	Firestone	6	85	Prent.	Delco	Delco	6	Scrimps-Booth B-39
Seneca L	5	1185	108	30x3 1/2	Miller	3 1/2x4 1/2	Own	4	15-63	1 1/2-Ray.	4.75	B. and B.	Own	Stewart	Firestone	6	88	Prent.	Delco	Delco	6	Seneca L
Severin H	5	2400	123 1/2	32x4 1/2	Miller	3 1/2x5 1/2	Own	6	29-40	1 1/2-Ray.	4.50	B. and B.	Own	Stewart	Firestone	6	110	Camp.	Wagner	Wagner	6	Severin H
S. G. V.	7	5000	136	33x5	Firestone	4 1/2x6	Own	12	39-68	1 1/2-Strom.	3.77	Covert	Jacox	Warner	Firestone	6	162	Willard	West.	West.	6	S. G. V.
Shaw	7	6500	138	33x5	Goodyear	4 1/2x6	Own	12	39-68	1 1/2-Strom.	3.77	Covert	Jacox	Warner	Firestone	6	162	Willard	West.	West.	6	Shaw
Skelton	5	1295	112	32x3 1/2	optional	3 1/2x5 1/2	Own	4	19-60	1 1/2-Carter	4.25	B. and B.	Own	Stewart	Firestone	6	85	Prent.	Delco	Delco	6	Skelton
Spacke S-20	2	345	90	28x3 1/2	U. S.	3 1/2x3 1/2	Own	2	9-80	1 1/2-Carter	5.09	B. and B.	Own	Stewart	Firestone	6	85	Prent.	Delco	Delco	6	Spacke S-20
Standard 8-1	7	3400	127	34x4	optional	3 1/2x5 1/2	Own	8	33-80	1 1/2-Ray.	4.45	B. and B.	Own	Stewart	Firestone	6	160	Willard	West.	West.	6	Standard 8-1
Stanwood	5	2050	118	32x4	Goodyear	3 1/2x4 1/2	Own	6	25-35	1 1/2-Strom.	4.50	B. and B.	Own	Stewart	Firestone	6	85	Prent.	Delco	Delco	6	Stanwood
Stearns SKL-4	5	2450	125	34x4	Goodyear	3 1/2x5 1/2	Own	6	25-35	1 1/2-Ray.	4.50	B. and B.	Own	Stewart	Firestone	6	85	Prent.	Delco	Delco	6	Stearns SKL-4
Stephens 80	6	2250	122	33x4 1/2	Fisk	3 1/2x4 1/2	Own	6	25-35	1 1/2-Ray.	4.75	B. and B.	Own	Stewart	Firestone	6-8	116	U. S. L.	A-L	A-L	6	Stephens 80

Engines—Ruten, Rutenber; Cont., Continental; Weid., Weidely; North., Northway; H.S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTear-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. Carburetor—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sundeman; Stew., Stewart; H-K., Holley-Kingston; Newc., Newcomb; Scheb., Schieber; Tillot., Tillotson; Johns., Johnston. Fuel feed vacuum except where otherwise indicated. \*Pressure. #Gravity. Generator and Motor—A-L., Auto-Lite; West., Westinghouse; #, Westinghouse or Auto-Lite; W-L., Ward-Leonard; Dyn., Dyneco; N. E., North East; L-N., Leese-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S.H., Simms-Huff; G. & D., Gray & Davis. Ignition—A-K., Atwater-Kent; Conn., Connecticut; Eise., Eismann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. Gearset—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. Rear Axle—Col. Columbia; W-Weiss Walker-Weiss; C-Timk. Cadillac-Timken; West-Mott Weston-Mott. Universals—Hart. Hartford; Ther-H. Thermoid-Hardy; U. M. Co. Universal Machine C Speedometer—J-Man. Johns-Manville; V-Sicklen Van Sicklen; A-C., Allis-Chalmers.



Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Stevens-Duryea	7	7000	138	35x5	optional	4 1/2 x 5 1/2	Own	6	47 25	—Strom.	.....	Own	Own	Own	Own	Own	Waltham	Firestone	6	.....	.....	West.	West.	West.	6	Stevens-Duryea
Studebaker E-J	5	1485	112	32x4	31x4 1/2	3 1/2 x 5	Own	6	23 44	—Strom.	4.55	Own	Own	.....	Own	Own	Stewart	Kelsey	6	80	Willard	Wagner	Remy	Berl.	6	Studebaker E-J
Studebaker E-G	7	2250	126	33x4 1/2	31x5	3 1/2 x 5	Own	6	36 04	Ball	3.70	Own	Own	Spicer	Own	Own	V. Sicklen	Kelsey	6	80	Willard	Wagner	Wagner	Wagner	6	Studebaker E-G
Studebaker E-H	5	1785	119	32x4	31x5	3 1/2 x 5	Own	6	29 40	—Strom.	4.33	Own	Own	Spicer	Own	Own	V. Sicklen	Kelsey	6	80	Willard	Wagner	Wagner	Wagner	6	Studebaker E-H
Stutz H	6	3600	130	32x4	optional	4 1/2 x 6	Own	4	30 63	1 1/2 Strom.	3.50	Own	Own	Own	Own	Gemmer	Warner	.....	6	130	Willard	Remy	Remy	Delco	6	Stutz H
Templar A-445	5	2685	118	32x4	optional	3 1/2 x 5 1/2	Own	4	18 23	1 1/2 Strom.*	4.40	B. and B.	Own	Hardy	American	C. A. S.	Warner	Firestone	6	100	Willard	Bijur	Bijur	Simms	6	Templar A-445
Texas B-38	5	1395	115	33x4	Southland	5x3 1/2	Own	4	19 60	—Car.	4.50	B. and B.	Own	Detroit	Peru	C. A. S.	Stewart	Firestone	6	80	Willard	Bijur	Bijur	Conn.	6	Texas B-38
Tulsa E	5	1445	117 1/2	33x4	Firestone	5x3 1/2	H-S	4	19 60	1 1/2 Zen.	4.66	B. and B.	Own	.....	Timken	C. A. S.	V. Sicklen	Firestone	6	120	Willard	Bijur	Dyn.	Bijur	6	Tulsa E
Vellie 48	5	1885	115	32x4	Goodyear	3 1/2 x 5	Lyc.	6	25 35	—Ray.	4.50	B. and B.	Own	Arvac	Col.	Gemmer	V. Sicklen	Firestone	6	108	Willard	West.	West.	A-K	6	Vellie 48
Vellie 34	5	1585	112	32x3 1/2	optional	3 1/2 x 4 1/2	Cont.	6	21 44	—Ray.	4.60	B. and B.	Own	Arvac	Salisbury	Gemmer	V. Sicklen	Firestone	6	100	Willard	West.	West.	A-K	6	Vellie 34
Vogue 6-55	5	2285	124	32x4	Goodrich	3 1/2 x 5	H-S	6	25 35	—Scheb.	4.50	B. and B.	Own	Arvac	Salisbury	Gemmer	V. Sicklen	Firestone	6	108	Willard	West.	West.	A-K	6	Vogue 6-55
Vogue 6-66	5	2485	124	33x4 1/2	Goodrich	3 1/2 x 5 1/2	Cont.	6	29 40	—Scheb.	4.50	B. and B.	Own	Arvac	Salisbury	Gemmer	V. Sicklen	Firestone	6	145	Exide	West.	West.	A-L	6	Vogue 6-66
Wasp	4	5000	132	33x5	Firestone	4 1/2 x 5 1/2	Wis.	4	36 10	1 1/2 Strom.	3.10	Own	Own	Spicer	Timken	Gemmer	Stewart	Firestone	6	117	Willard	Delco	Delco	Bosch	6	Wasp
Westcott C-38	5	2400	118	33x4	Firestone	3 1/2 x 4 1/2	Cont.	6	25 35	1 1/2 Ray.	5.09	B. and B.	Own	Peters	Timken	Gemmer	V. Sicklen	Firestone	6	117	Willard	Delco	Delco	Delco	6	Westcott C-38
Westcott C-48	7	2900	125	32x4 1/2	Firestone	3 1/2 x 5 1/2	Cont.	6	29 40	1 1/2 Ray.	4.45	B. and B.	Own	Peters	Timken	Gemmer	V. Sicklen	Firestone	6	117	Willard	Delco	Delco	Delco	6	Westcott C-48
Willys-Knight 20	5	2250	118	33x4	Fisk	3 1/2 x 4 1/2	Own	4	21 03	1 1/2 Tillot.*	5.00	Own	Own	Ther-H.	Own	Gemmer	Stewart	Stanweld	.....	170	U. S. L.	A-L	A-L	Conn.	6	Willys-Knight 20
Winther 61	5	2250	120	32x4	Goodyear	3 1/2 x 5	H-S	6	25 35	1 1/2 Strom.	4.50	Warner	Warner	Peters	Spacke	Lavine	Stewart	Firestone	6	127	Willard	West.	West.	Bosch	6	Winther 61
Winton 25	7	4600	132	35x5	optional	4 1/2 x 5 1/2	Own	6	33 75	1 1/2 Strom.	4.90	.....	.....	.....	.....	.....	Warner	Firestone	6	120	Willard	Bijur	Bijur	Bosch	6	Winton 25

## STEAM CARS

Name and Model	Seating Capacity	Price	Wheelbase	Rear Tire Size	Make of Tire	Bore and Stroke	Engine Make	No. Cylinders	N. A. C. C. H. P.	Carburetor Size and Make	Gear Ratio	Clutch	Gearset	Universals	Rear Axle	Steering Gear	Speedometer	Rims	Battery Volts	Battery Amp.	Battery Make	Generator Make	Motor Make	Ignition Make	Lamp Voltages	Name and Model
Stanley 735-B	7	4275	130	34x4	Goodyear	4-5	Own	2	.....	none	none	none	none	.....	Own	.....	V. Sicklen	Firestone	6	116	Willard	Remy	None	None	6	Stanley 735-B

Engines—Ruten, Rutenber; Cont., Continental; Weid., Weidely; North., Northway; H-S., Herschell-Spillman; Lyco., Lycoming; D-Lyco., Dort-Lycoming; G. B. & S., Golden, Belknap & Swartz; T-McTector-McFarlan; #, Monson or Duesenberg; R. & V., Root & Van Dervoort. Carburetor—Strom., Stromberg; Zen., Zenith; Ray., Rayfield; John., Johnson; Mar., Marvel; Sund., Sunderman; Slew. Stewart; H-K., Holley-Kingston; Newc., Newcomb; Scheb., Schaefer; Tillot., Tillotson; Johns., Johnston. Fuel feed vacuum except where otherwise indicated. \*Pressure. Generator and Motor—A-L., Auto-Lite; W-L., Ward-Leonard; Dyn., Dyneto; N. E., North East; L-N., Leese-Neville; A-C., Allis-Chalmers; Split., Splitdorf; S-H., Simms-Huff; G. & D., Gray & Davis. Ignition—A-K., Atwater-Kent; Conn., Connecticut; Eise., Eisemann; West., Westinghouse; Will., Willard; N. E., North East; K-Remy, Kingston-Remy; Berl., Berling; Bosch-W., Bosch-Westinghouse; Split., Splitdorf. Gearset—G-L., Grant-Lees; North., Northway; B-L., Brown-Lipe. Rear Axle—Col., Columbia; W-Weiss, Walker-Weiss; C-Timk., Cadillac-Timken; West-Mott, Weston-Mott. Universals—Hart., Hartford; Ther-H., Thermoid-Hardy; U. M. Co., Universal Machine Co. Speedometer—J-Man., Johns-Manville; V-Sicklen, Van Sicklen; A-C., Allis-Chalmers.

## The Pneumatic Truck Tire

(Concluded from page 19)

tion, which increases the truck use on bad roads and in snow. Undoubtedly the movement towards good roads is more favorable to solid tires, and the pneumatic seems to be truck panacea for the bad roads of America.

Another large manufacturer thoroughly believes that the giant pneumatic has a place in the truck industry, but that discretion must be used on the part of the dealers in placing these trucks so equipped. This maker believes that the motor truck, whether fitted with solid or pneumatic tires, must be sold on a basis of its ability to operate at the lowest ton-mile cost. This is the viewpoint of the fleet owner who has to pay the bills.

The point of view of the buyer must always be consulted and considered by the salesmen. Where there is a demand for greater operating radius and where the importance of prompt delivery at the destination are important factors, the case of the pneumatic stands out very favorably. Taking two trucks, one fitted with solids and the other with pneumatics, the time consumed in making a delivery is approximately one-half with the pneumatic what it is with the solid, this regardless of the character of load. Where road conditions are bad the advantage for the pneumatic is correspondingly greater. In the delivery of perishable foodstuffs, and fragile merchandise, there is a natural advantage for the pneumatic with its higher speed and superior cushioning qualities.

## Equipping for Service

Every tire manufacturer, or most of them, manufacturing giant pneumatics, have adopted definite policies for service stations. Some of the leading tire makers have gone so far as to completely analyze local town conditions and arrive at the number of trucks with pneumatic tires necessary for the transportation work of the town and computed tables on the probabilities of immediate sales. These figures form the basis of what will be needed in a service way. Where only a few pneumatic tired trucks are in a town the tire service station simply stocks a few tubes and repair equipment, such as cord patches, cements, etc. Giant pneumatics are stocked at these service stations as soon as the need for replacements is evident. The dealer contemplating adding a giant pneumatic tire line to his business would first be called upon to stock tubes and repair equipment as suggested.

## GAS SHORTAGE IN NEW YORK

Buffalo, May 28—Railroad car shortages have resulted in gasoline scarcity in many of the smaller communities of Western New York. In Niagara Falls motorists were dependent upon truck loads of gasoline shipped from Buffalo. This method of delivery provided a supply amounting to but 25 per cent of the demand, it was estimated.

# From the Four Winds

## Glimpses at the World of Motordom

### COMING MOTOR EVENTS

#### AUTOMOBILE SHOWS

Indianapolis.....	Fall Automobile Show.....	Sept. 6-11
Northampton, Mass.....	Annual Automobile Show.....	Oct. 6-8

#### FOREIGN SHOWS

Antwerp.....	Cars, Tires, Wheels, Parts and Equipment.....	May 15-June 13
Antwerp.....	Commercial Vehicles, Tractors, Trucks and Engines.....	June 26-July 25
London.....	Commercial Vehicles, Exhibition, Olympia.....	October
London.....	Passenger Car Show, Olympia.....	November

#### CONVENTIONS

Charleston, S. C.....	South Carolina Automotive Trade Assn.....	June 24-25
-----------------------	---	------------

#### RACES

Uniontown, Pa.....	Speedway Race.....	June 12
Portland, Ore.....	Dirt Track.....	June 17
Chicago, Ill.....	Inter Club Run.....	June 17-18
Ogdensburg, N. Y.....	Dirt Track.....	June 19
Hanford, Cal.....	Dirt Track.....	July 4
Spokane, Wash.....	Dirt Track.....	July 4
Tacoma, Wash.....	Speedway Race.....	July 5
Batavia, N. Y.....	Dirt Track.....	July 5
Warren, Pa.....	Dirt Track.....	July 17
Watertown, N. Y.....	Dirt Track.....	July 24
Fulton, N. Y.....	Dirt Track.....	July 31
Paris, France.....	Grand Prix Race, Sporting Commission.....	August
Elgin, Ill.....	Dirt Track.....	Aug. 7
Buffalo, N. Y.....	Dirt Track.....	Aug. 14
Johnstown City, Pa.....	Dirt Track.....	Aug. 21
Elgin, Ill.....	Road Race.....	Aug. 21
Middletown, N. Y.....	Dirt Track.....	Aug. 20-21
Flemington, N. J.....	Dirt Track.....	Aug. 27-28
Canandaigua, N. Y.....	Dirt Track.....	Aug. 28
Cincinnati, O.....	Speedway Race.....	Sept. 6
Hornell, N. Y.....	Dirt Track.....	Sept. 6
Uniontown, Pa.....	Speedway Race.....	Sept. 6
Syracuse, N. Y.....	Dirt Track.....	Sept. 17-18
Allentown, Pa.....	Dirt Track.....	Sept. 25

#### TOURS

Omaha, Neb.....	Truck Reliability Run.....	June 14
Milwaukee, Wis.....	Wisconsin Truck Tour, Milwaukee Sentinel.....	June 21-26
Lake Huron Tour.....	Michigan Pike Assn.....	July 4
New York-San Francisco.....	Glidden Tour.....	September
Milwaukee, Wis.....	Annual Fall Automobile Show.....	Aug. 30-Sept. 4

### Tomorrow's Mechanics

(Concluded from page 17)

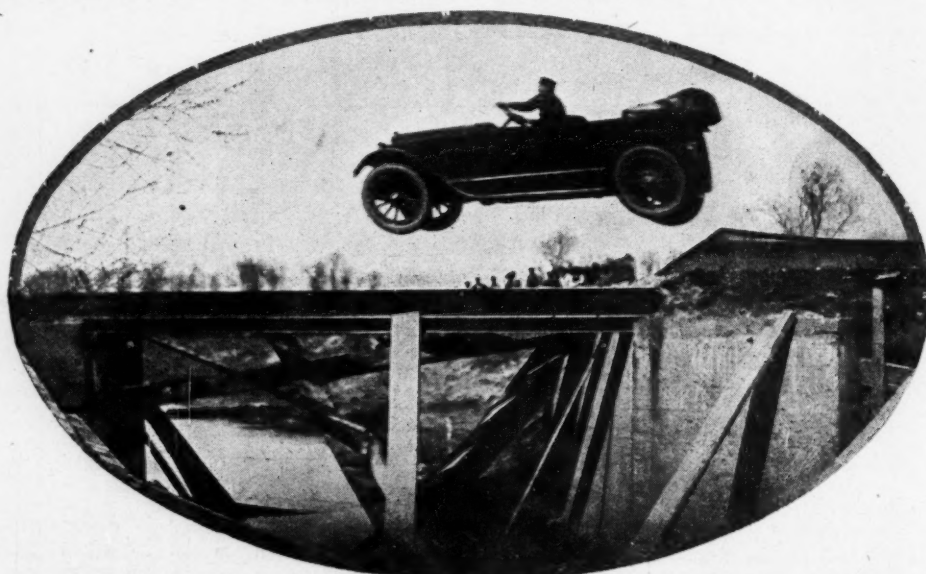
plaining among garage employees, particularly in regard to Sunday work. Many of the men say they would be willing to take prospects out on demonstration trips on Sunday but when it comes to reporting for work at the usual time, donning overalls and following the same routine that applies on week-day, they feel that they are being discriminated against when they look around and see men in various other lines of employment enjoying a full day's rest. Some dealer service stations are closed on Sunday, but many are open and a good many of the smaller town garages are in full operation, especially for filling service.

Throughout the territory quite a number of proprietors were found who favored closing on Sunday, even to the filling stations, providing their competitors would do the same, but nowhere was there found sufficient agreement on the question to result in a decision to restrict service to six days.

Farmers are buying tractors in satisfactory quantities in view of the average small farm acreage, which runs

from 100 down. There has been some complaint by county farm bureau managers of overzealousness on the part of tractor salesmen, with the result that farmers have been sold tractors which did not fit their needs.

Bankers in the territory are showing more support of truck and tractor than in passenger car financing. There has been noticed some curtailment in bank acceptance of passenger car paper, along with similar slight restrictions on other lines of merchandising, the bankers stating that there is no intention to discriminate against the automobile industry, but that curtailment is necessary in all lines because credit demands exceed local resources. In several cities bankers have called dealers into conference and have advised a holding down on time sales of cars, but so far there has been no denial of credit to a dealer in the financing of his car business. Dealers themselves are trying to discourage time sales and a number who handle low priced, popular lines are selling for cash. Bankers have shown no disposition to restrict loans on truck and tractor purchases, even when the payment terms were longer than the average on cars, and have given as a reason for this attitude their desire to assist development of their territory, particularly the farming sections.



This feat was recently filmed at a point near Elgin, Ill., where a dirt road is crossed by a creek. The side rails and all planks over the bridge were torn out, leaving only the iron girders spanning a gap 27 ft. wide and 14 ft. deep. C. J. Wilson, driver of the car took a running start. Attaining a speed of 55 miles per hour, the car struck a slight incline at the bank of the creek, landing 58 feet from the take-off, more than twice the distance necessary to clear the opposite bank. The car, an Elgin Six stock model, after making the "leap for life," bounded along like a jack rabbit before being brought to a halt.